Logicube OmniClone® Xi User's Manual

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MAN-OMNICLONEXI

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Logicube Technical Support Contact Information

1. By website: www.logicube.com
2. By email: techsupport@logicube.com
3. By telephone: 1 -(818) 700 8488 ext. 3 between the hours of 8am –6pm PST.

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1. Introduction to the Logicube OmniClone® Xi

Introduction

Congratulations on your purchase of the Logicube OmniClone® Xi. You are now the proud owner of a state-of-the-art IDE/SATA disk cloning device. The OmniClone® Xi is designed to be easy enough to be used by a novice, yet offers many professional features that are not available anywhere else.

The Logicube OmniClone® Xi copies the contents of one hard disk drive to one or more others[1]. The first drive is typically called the Master, while the subsequent drives are called Targets. It performs the copy at speeds that are typically 16 to 32 times faster than they would be on a PC. The OmniClone® Xi first analyzes the partitions on the Master, then acts according to a user set mode. Depending on the mode, the unit will adjust structures to ensure the validity of the Targets. This process is called disk cloning.

This manual covers the following Logicube products: **OC2Xi™**, **OC5Xi™** and **OC10Xi™**. The OC2Xi™ can clone two target drives, the OC5Xi™ can clone 5 target drives and the OC10Xi™ can clone ten target drives simultaneously.

What Are Partitions?

Partitions are areas on the drive that define a storage unit. Each partition is represented by a drive letter at the operating system level (e.g. C:, D:,...). For that reason, partitions are commonly called **logical drives**, or **volumes**. A partition is also associated with **a file system**, or a structure for laying out files on the partition. We will use these four words interchangeably throughout this manual.

[1] The Logicube OmniClone® Xi is available in 2, 5 and 10 Target drive configurations.

Hundreds of different types of file systems have been designed through the years. Only a handful are in common use. Among those are FAT16, FAT32, and NTFS.

FAT16 – The file system used by DOS since version 3.3. This file system can be a maximum size of 2GB, and can be used under Win95/98, Win2000, and Windows NT. It is still a widely used file system. FAT is the acronym of File Allocation Table, with entries that are 16 bit wide, hence the FAT16 name.

FAT32 – Supported by Win98, WinME and Win2000. Entries in the FAT are 32 bits each thus eliminating the 2GB limit and offering improved space efficiency.

NTFS – In use by Windows NT, Win2000, WinXP and Vista. Offers improved access speed, and some security and recoverability features.

The Logicube OmniClone® Xi is “aware” of the above three file systems and will clone them over “intelligently”.

Features

- Clones any IDE, EIDE or Serial ATA Drive.
- Data transfer rates in excess of 3.5 GB/min.
- Master and Target drives can be of different size, make and model.
- Master drive can contain up to 24 partitions.
- Easy to read graphical interface.
- Calibrated touch screen for fast input of settings and data.
- Light Bar and buzzer show unit status and alert operator of any errors.
- Automatically scales FAT16/32, NTFS 4.0/5.0/6.0, and Windows 2000/NT/ME/XP partitions.
- Able to Clever copy most Windows Vista configurations.
- USB port connectivity for the compact Flash.
- Optional diagnostics software for drive scanning and repairing, data recovery, and Department of Defense (DoD) specification data wiping.
- User-replaceable drive station modules and power supply for ease of maintenance.
- Removable Compact Flash (CF) Drive.

Using this guide

This user guide is made up of 11 sections:

- Introduction
- Getting Started (Fast Start)
- Cloning Modes and Settings
- Omnidiagnostics™
- The Database/Barcode Option
- The Serial Link Option
- Using the USB Port
- Compact Flash (CF) Drive
- User-replaceable Hardware
- Verification Station
- Software Loading Instructions
- Frequently Asked Questions
- Reference
- Index

Please read Section 1. *Introduction*, and Section 2. *Getting Started* before attempting a drive cloning session. It is recommended that you practice with a scratch drive to fully appreciate all of the features.

System description

The complete Logicube OmniClone® Xi system includes the following:

- The Logicube OmniClone® Xi unit.
- For the OC2Xi™, three (3) 68-pin flat ribbon cables, three (3) drive power cables and three (3) SATA Cables are provided.
- For the OC5Xi™, six (6) 68-pin flat ribbon cables, six (6) drive power cables and six (6) SATA Cables are provided.
- For the OC10Xi™, eleven (11) 68-pin flat ribbon cables, eleven (11) drive

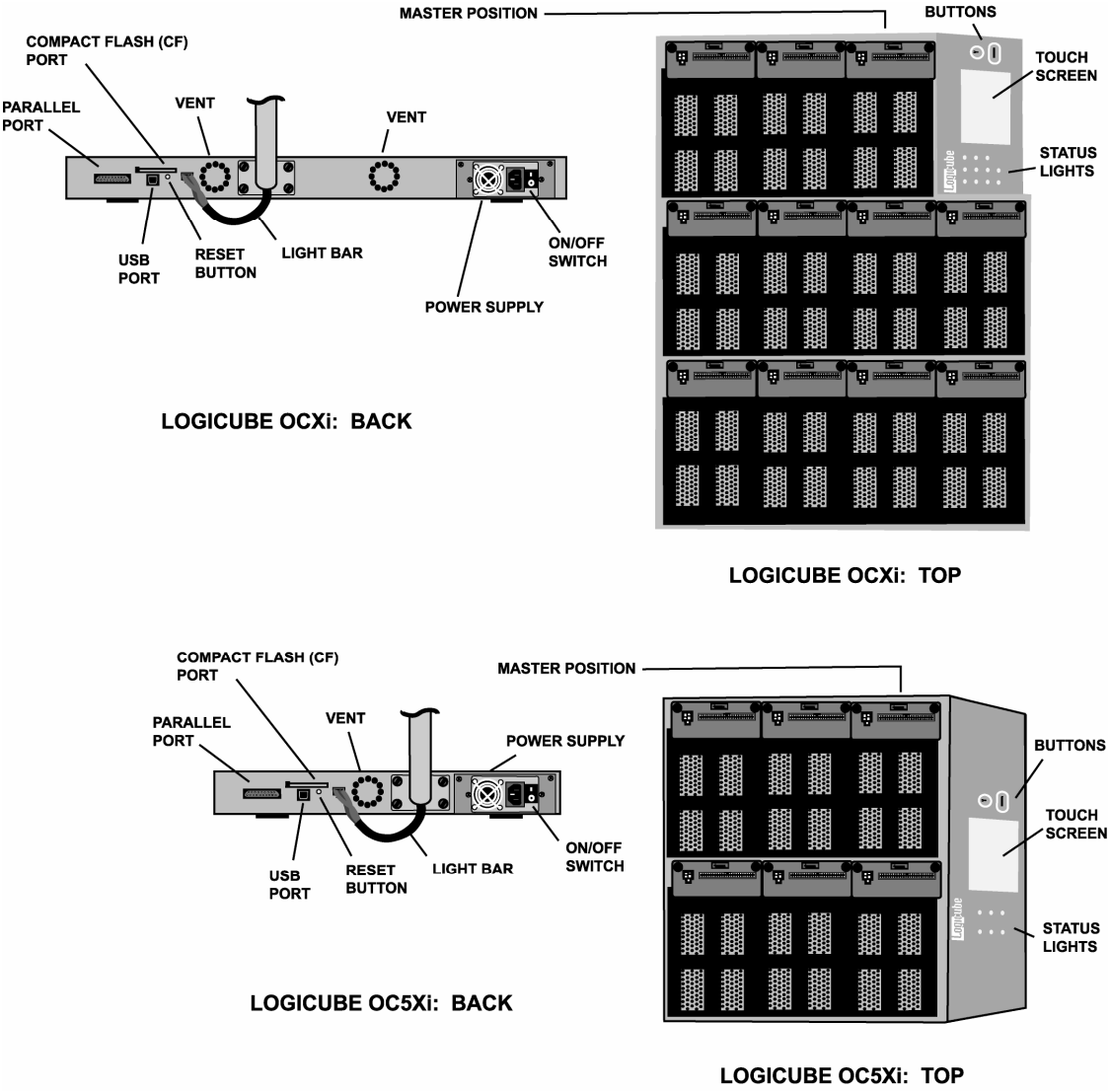
power cables and eleven (11) SATA Cables are provided.

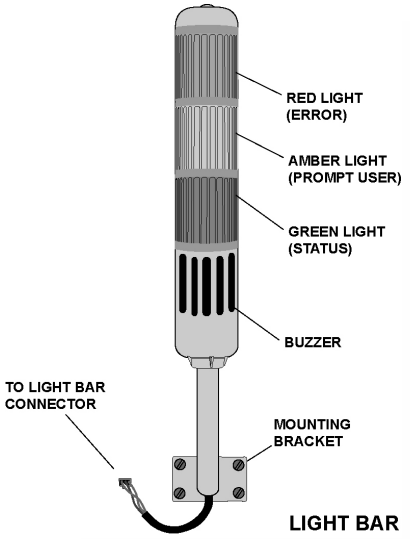
- For the OC10Xi™ and OC5Xi™: An AC power cord.
- For the OC2Xi™: An external 12VDC – 5.5A power supply.
- A light bar/buzzer that mounts on the back of the unit.
- **NOTE:** The OC2Xi™ does not come with a light bar, though one can be purchased separately.
- A bootable CD-ROM containing:
  - A backup copy of the software that is already pre-installed on the Logicube OmniClone® Xi.
  - Software update utilities necessary to load the software on the unit.
  - Windows 98/ME drivers for connecting through the USB port.
  - An electronic copy of this manual.
- A 64MB Compact Flash (CF) Memory Card. This Card is inserted into the slot in the back of the unit.

  NOTE: It is highly recommended that the CF Card be left inside the Omniclone® Xi for optimal performance.
- This manual.

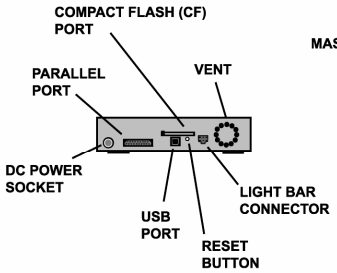
NOTE: Please contact Logicube Technical Support at (818) 700-8488 X3 if any pieces are missing.

Figure 1. Logicube OmniClone® Xi

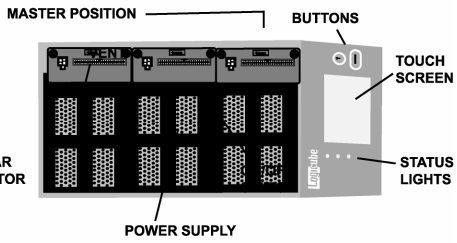




LIGHT BAR



LOGICUBE OC2Xi: BACK



LOGICUBE OC2Xi: TOP

Caution: Avoid dropping the Logicube OmniClone® Xi or subjecting it to sharp jolts. When in use, place it on a flat surface.

Caution: Keep the unit dry. If you need to clean your Logicube OmniClone® Xi, use a lightly damp, lint free cloth. Avoid using soap or other cleaning agents particularly those containing bleach, ammonia, alcohol or other harsh chemicals.

Caution: Do not attempt to service the Logicube OmniClone®

Applying power to the Logicube OmniClone® Xi

The Logicube OmniClone® Xi is able to detect whether an IDE (parallel) or Serial ATA (SATA) drive is attached to the Master or Target positions. The unit is capable of cloning to/from a SATA drive to an IDE drive and vice versa (as well as IDE to IDE and SATA to SATA).

NOTE: Never attach both an IDE and SATA drive to the same drive position. The unit can only handle one drive on each position.

Before applying power perform the steps listed below.

Connecting Parallel (IDE, EIDE, UDMA) Drives

1. Locate the Master position on the top of your OmniClone® Xi unit. You will notice three connections: One for a flat cable (the drive data cable) and another for a small drive power cable. Above is the third connector for the Serial ATA cable.

   Note: The drive that is cloned from is always referred to as the **Master** drive and the drives that are cloned to are always referred to as the **Target** drives.

2. Attach the 5" UDMA ribbon cable and the drive Power cable to the connectors.
3. Connect the Master hard drive to the cables and verify that the drive's jumper is set to Single Master.
4. Follow steps 1 – 3 to attach drives to the Target positions of the Logicube OmniClone® Xi.
5. Connect the AC Power Cord to the back of the Logicube OmniClone® Xi and power-up the unit. In 2 – 3 seconds, the main "Splash" screen appears.

Connecting Serial ATA (SATA) Drives

1. Locate the Master position on the top of your OmniClone® Xi unit. You will notice three connections: One for a flat cable (the drive data cable) and another for a small drive power cable. Above is the third connector for the Serial ATA cable.

   Note: The drive that is cloned from is always referred to as the **Master** drive and the drives that are cloned to are always referred to as the **Target** drives.

2. Attach the 5" SATA cable to the SATA and drive power connectors.
3. Connect the Master hard drive to the cable.

   Note: SATA drives usually do not need to have a jumper set to Single Master.

4. Follow steps 1 – 3 to attach drives to the Target positions of the Logicube OmniClone® Xi.
5. Connect the AC Power Cord to the back of the Logicube OmniClone® Xi and power-up the unit. In 2 – 3 seconds, the main "Splash" screen appears.

Connecting other types of drives

Logicube sells specialized adapters that allow the following types of drives to be connected to the Logicube OmniClone® Xi:

- 2.5" Laptop drives (also called Notebook drives).
- 1.8" Laptop drives, (e.g. Toshiba iPod™ drives).
- Compact Flash (CF) Drives.

Other specialized adapters are also available. If you are unsure about the type of drive that you have, please contact Logicube Technical Support for assistance.

Note: SCSI drives and older IDE drives that are smaller than 500MB (unless LBA-enabled) are not supported by the Logicube OmniClone® Xi.

Power and Reset buttons

The Logicube OmniClone® Xi includes one On/Off switch and one reset button. The power switch is a rocker switch that is located on the unit's power supply. The reset button is located on the back of the unit underneath the Compact Flash Drive slot.

When the unit needs to be soft-booted (or power cycled), press the reset button and hold it in momentarily. Wait a couple of seconds and let go, the unit will reboot and be ready to use in a few seconds.

NOTE: User settings are retained after the unit is restarted.

The user interface

The user interface (UI) has been designed with the professional in mind. It is fast, responsive, and to the point; which means it requires very few keystrokes to achieve a desired action.

NOTE: Please refer to Figure 2 on page 12 as you read the information below.

Touch Screen

The OmniClone® Xi features an LCD Touch Screen that allows the user to quickly input commands. This screen replaces many of the buttons that were present on older Logicube duplication products. The screen is bright and easy to read. It also emits an audible beep every time the touch screen is pressed. This lets the user know that the touch screen is active.

Calibrating the Touch Screen

There may be times when the user wants to recalibrate the Touch Screen. The procedure for this is very simple as outlined in the procedure below:

1. Press the Reset button on the back of the unit and hold it in.
2. Press and hold the Set button, then release the Reset button.

3. Hold the Set button until the unit boots to a screen that reads “Touchpad Calibration. Please touch square with finger (1/5)”.
4. Look for a square at the top of the screen. Touch the square when it is located.
5. Repeat the previous step four more times. The unit will count each time the square is pressed correctly. It will count (1/5), (2/5), etc.
6. Once the screen has been calibrated, it will reboot to the Main Menu Screen.

Buttons

The OmniClone® Xi features two “Shortcut” buttons that are located to the right of the touch Screen. These buttons are available at all times.

- **START/STOP** Button – Press it twice to begin a cloning operation using the current settings; press the START/STOP button in mid process to abort it. A single key stroke presents a preview screen where you can see the current setting, and decide whether to press it again to begin the capture, or back out to reconfigure.
- **SET** Button – Press this button once to bring you to the settings screen where you can change capture modes and other settings of the unit.

Indicator Lights

The OmniClone® Xi has indicator lights that are located on the User Interface panel as well as on the light bar. The lights are as follows:

The **POWER** indicator light is a red LED located to the right of the Touch Screen. It remains on while the Logicube OmniClone® Xi is receiving power.

The **STATUS** indicator lights are located to the left of the Touch Screen as a series of green LED’s. Each Master and Target drive position has a corresponding Status indicator. These lights are lit during cloning operations and any operation that accesses the Master or Target drive. They will flash as data is transferred from one drive to the other.

The **GREEN** light on the light bar is also a general Status indicator light. It will blink during a cloning or diagnostic operation. In addition, if the unit completes an operation successfully the green light will stay lit.

If an error occurs during cloning, the Status indicator lights on the front panel will shut off. If one of the

drives caused the error to occur, the Status LED of the drive will remain lit.

The **AMBER** light on the light bar lights up when the unit prompts the user to enter information during a cloning or diagnostic operation.

The **RED** light will come on if a problem is encountered during cloning or any other operation. If this occurs, check the screen for an error message and instructions on what to do next.

Buzzer

In addition to the indicator lights, the light bar also has an audible buzzer to alert the operator of the following conditions:

The buzzer will emit a “finished” tone if the cloning session ends successfully.

If the cloning session stops with an error message, the buzzer will alert the user with an “error” tone.

NOTE: Changing the config.ini file that is located on the OmniClone® Xi’s CF Card can turn off the buzzer. Please refer to Section 8 – **Compact Flash (CF) Card** for more information.

Installing and Removing the Light Bar

The light bar is attached to the back of the OmniClone® Xi unit and can be removed if desired. This will not affect the performance of the unit.

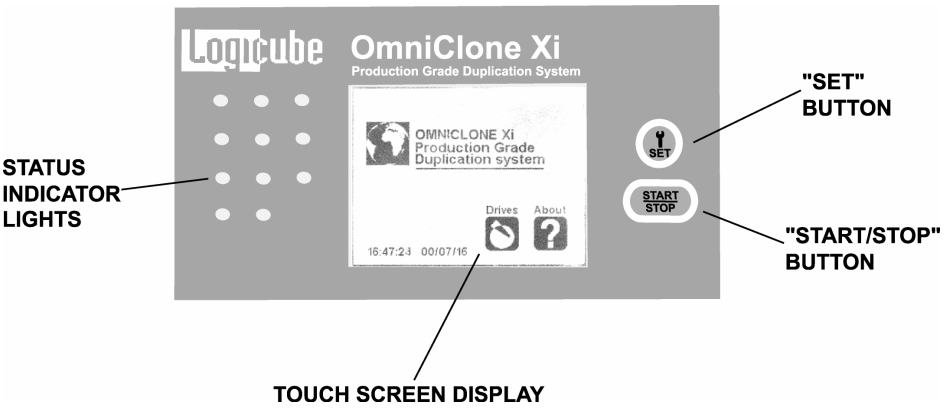
1. To install the light bar on the OC10Xi or the OC5Xi, it first needs to be attached to the back of the unit with four supplied thumb-screws.

   NOTE: The OC2Xi does not come with a light bar, though one can be purchased separately. The light bar will have to be mounted to a base as the OC2Xi does not have mounting holes.

2. Attach the light bar’s power cable to the six-hole Molex™ connector that is located on the back of the unit to the right of the Compact Flash Drive slot.

3. Light bar removal is the opposite of installation.

Figure 2. Buttons and Interface



Main Menu Screen

The main menu screen appears when the Logicube OmniClone® Xi is first powered up. It displays the Title Screen and the **Time/Date**. It also displays two menu options: **About** and **Drives**.

Time/Date Settings

The OmniClone® Xi has a real-time clock that keeps track of the correct time and date. The time and date can be easily set by following this procedure:

1. Touch the screen over the Time and Date. A numeric Keypad will come up.
2. Type in a number from 1 to 23 for the hour, (the clock is set to "military time". Touch OK when finished.
3. Type in a number from 0 to 59 for the minutes. Touch OK when finished.
4. Type in a number from 1 to 31 for the day. Touch OK when finished.
5. Type in a number from 1 to 12 for the month. Touch OK when finished.
6. Type in a number from 0 to 99 for the year, (the clock is set to a range of 2000 – 2099). Touch OK when finished.
7. The Date and Time will now be set to the entered values.

About Screen

Select the About Screen by pressing the "**About**" icon. It will display the serial number of your unit along with the software and firmware versions that are loaded. In addition, the About screen lists all options currently enabled on the unit and provides contact information for Logicube Technical Support.

To return to the main menu, simply press the **"Back"** icon at any time.

Drives

Select the Drive Info screen by pressing the "**Drives**" icon. The unit will then power up all of the drives that are attached. After 30 to 45 seconds, the unit will show a list of all the drives it has detected. If a drive is pressed on the Touch Screen, the unit will access the drive and report back the drive's model number, capacity, geometry and other information.

To see the drive's partition information, press the "**See More**" icon to display all of the partitions located on that drive.

To return to the list of drives, you may press the "**Back**" icon at any time. Pressing the Back icon again will go back to the Main Menu Screen.

A Note About the Back Icon

The Back icon can be found in the lower left hand corner on most of the Touch Screens. Touching this icon will go back to the previous Settings screen or the Main Menu Screen.

Cloning

The Logicube OmniClone® Xi provides several different modes of operation for cloning virtually any hard drive quickly and effectively. Here we will discuss the most frequently used cloning modes, and provide step-by-step instructions for each.

Clever Clone™ and Mirror Clone™ Mode come standard with the OmniClone® Xi. Selective Clone™, Master Manager™, NTFS Clever Clone™ and Omnidiagnostics™ are options that can be purchased for the unit.

We will also cover each of the other optional preference settings found under the Settings menu, and explain what they do and when to use them.

Other topics discussed at the end of this section include:

Windows Vista presents some caveats with Clever Clone™. If you are cloning Windows Vista configurations, please read **"Cloning Windows Vista"** later in this section.

At the end of the section will be a special discussion on dealing with SID (Security Identification) issues under the Windows NT, Windows 2000 and Windows XP operating systems.

Also at the end of the section is a discussion about the NTFS "dirty bit" and it's role in verifying NTFS partition data. Please read this section if you are cloning NTFS drives with NTFS Clever Clone mode.

NOTE: Each time the Logicube OmniClone® Xi is rebooted the cloning mode and preference settings are saved from the last cloning session.

Clever Clone™ Mode

This is the default mode. It clones ALL partitions on the Master drive to the Target drives, automatically deciding the fastest method possible for each partition found. It scales all known partitions (At this writing – FAT16/32, and NTFS[2]) to fill the Target in its entirety and makes all the necessary adjustments to ensure valid and bootable Target drives.

NOTE: Any unrecognizable partition is automatically cloned with Mirror Clone mode. This includes non-Windows partitions like Linux, Unix, BSD and other partition types.

Clever Clone™ Step-by-Step

1. From anywhere in the menu system click the **"Set"** button to enter the Settings menu.
2. Press the Cloning Mode icon that appears in the upper left-hand corner. A list of the available cloning modes appears.
3. Press the **"Clever"** icon, the Clever Clone™ settings screen will appear.
4. Adjust the **"Verify"**, **"CHS"** and **"SPEED"** settings as needed. (These settings are discussed later in this section).
5. You may now double-click the **"Start/Stop"** button to start cloning.

NOTE: When Clever Clone™ scales down an NTFS partition, it can only scale it to 55% of the original size.

[2] NTFS Clevercopy™ is an option that can be purchased for the OmniClone® Xi.

Selective Partitions™ Mode (Optional)

This is the most elaborate and most flexible mode. It allows the highest level of control over the cloning process.

Selective mode allows you to select one or multiple partitions to clone. It also allows you to choose a unique copy method[3] to use for each. The available methods are:

Clever Clone™ – The default mode that lets the OmniClone® Xi determine the best (usually fastest) way to clone. It is denoted by the light bulb icon. It works with all FAT16/FAT32 and NTFS type partitions.

NOTE: NTFS Clever Copy™ is an optional feature and will only be available if purchased and installed on your unit.

Defragment – Forces the defragmentation of all partition data. This mode uses an advanced defragmentation algorithm to create a Target partition with no gaps and with contiguous files. It works with FAT16/FAT32. Defragmentation is a rather slow process and should be used only when a single copy is required of a given Master drive. In cases where multiple copies are desired, it is much better to use a defragmentation program on the PC for the Master and then move the Master drive onto the OmniClone® Xi.

NOTE: Clever Copy™ mode will resort to the defragmentation method if the given partition is FAT16 and a cluster size change is required to create a valid Target partition.

Partition Mirror – Simply streams over the full contents of the selected partition without allowing any partition scaling (Do not confuse this mode with the Mirror copy mode which mirrors the entire Master drive). This method is available for any partition type. This is the only method available to unrecognized partitions.

Keep Size – This is a version of partition mirror that is only used for cloning certain Windows Vista partitions. For details, please refer to the "Cloning Windows Vista" later in this section.

[3] Note that not all modes are available for all partition types.

Selective Partitions™ Step-by-Step

1. From anywhere in the menu system click the **"Set"** button to enter the Settings menu.
2. Press the Cloning Mode icon that appears in the upper left-hand corner. A list of the available cloning modes appears.
3. Press the **"Selective"** icon, the unit will immediately power the Master drive and display the partition table.
4. On the right hand side you will see a designator for the partition type. Some examples are:
   - **16** - FAT16 partition
   - **32** - FAT32 partition
   - **NT** - NTFS partition
   - **Linux** – Linux partition
   - **??** - unknown partition
5. Touch the scroll icons to place the cursor by a given partition, and then touch the space to the left of the Volume Label multiple times to cycle among the 4 options. See **Figure 3**a below.
6. Scroll to other partitions and repeat Step 5. Note that it is OK to assign unique cloning modes to each selected partition.
7. When finished, press the **"Set"** button. The Selective Clone™ settings screen will appear.
8. Adjust the **"Verify"**, **"CHS"** and **"SPEED"** settings as needed. (These settings are discussed later in this section).
9. You may now double-click the **"Start/Stop"** button to start cloning.

NOTE: When multiple copies are required, all you need to do is change the TARGET drives, and hit "Start/Stop" twice. Your last selections are used. If the unit senses that the MASTER drive was changed (by reading the serial number of the MASTER), it will again return you to the selection screen, where you specify the method of copy for each partition.

NOTE: If you wish to change the last used settings (and the MASTER drive did not change), follow the "Selective Partitions Step-by-Step" instructions above.

Figure 3a: Selective Copy Modes

	CleverCopy	**Use the CleverCopy algorithm for this partition**
	Defragment	**Defragment this partition on-the-fly (FAT16/32 only)**
	Mirror	**Simple partition mirror (no adjustments)**
	Keep Size	**Special mode for cloning certain Windows Vista partitions.**
	None	**Do not copy this partition**

Mirror

Clone™ Mode

This mode simply makes a bit-by-bit mirror copy of the Master drive. It does not adjust any values. This mode is only recommended when all else fails and even then only between similar geometry drives. It is also recommended for non-Windows partitions like UNIX, LINUX and other such systems.

NOTE: Drives in a RAID array have dynamic or striped partitions and also need to be Mirror Cloned. When cloning a multiple drive RAID array, each drive in the array needs to be Mirror cloned to an identical Target drive.

You can dial the percentage of Master disk you wish to mirror. For example, setting to 50% will mirror the first 50% of the Master drive's size.

Mirror Clone™ Step-by-Step

1. From anywhere in the menu system click the "**Set**" button to enter the Settings menu.
2. Press the Cloning Mode icon that appears in the upper left-hand corner. A list of the available cloning modes appears.
3. Press the **"Mirror"** icon.

4. A screen appears asking you what percentage of the Master drive to clone. Touch the numeric keypad to adjust this value from 0 – 100%. If a value of 99% or less is chosen for the **FRONT** of the drive, the unit will also ask for a percentage from the **REAR** of the drive. This value can be set to the total size of the remaining space.
5. For example, if you were to enter 20 for the front and 30 for the back, Mirror Clone would copy the first 20% of the Master drive, skip over the next 50% and clone the remaining 30%.
6. You may now double-click the "**Start**/**Stop**" button to start cloning.

Master Manager™ Mode (Optional)

This is a special mode that assists in the creation of Master drives. It lets the user choose exactly one partition from the drive in the Master position (referred to henceforth as the **Source** drive) and clone it to the drive in the Target 1 position (referred to henceforth as the **Destination** drive).

The Master Manager is a useful tool to aid in the creation of a multi-partition Master drive. Many MIS technicians like to store multiple partitions (e.g. one for accounting, one for marketing, etc.) on a single Master drive. When a drive crash occurs or a new PC is to be configured, all the technician needs to do is select that partition and clone it. The tool is also useful to create backups of important partitions.

The OmniClone® Xi can hold up to 24 partitions on one Master drive. Drives over 250GB in size have been tested with Master Manager successfully.

Master Manager prompts the user to select exactly one partition on the **Source** drive. It then prompts the user to either select an existing partition on the **Destination** drive to overwrite, or to add a new partition in the remaining unallocated space.

WARNING: Please use this mode with care as the **Destination Drive** (your multi-partition master drive) is altered in the process.

Master Manager™ Step-by-Step

NOTE: To create a Master drive using Master Manager, you must start with an unformatted

drive. (Use the Wipeclean™ Mode, FDISK or a third party tool to wipe out the intended drive's partition table.)

1. From anywhere in the menu system click the Set button to enter the Settings menu.
2. Press the Cloning Mode icon that appears in the upper left-hand corner. A list of the available cloning modes appears.
3. Press the **"MMgr"** icon, the Master Manager™ settings screen will appear.
4. Adjust the **"Verify"** and **"SPEED"** settings as needed. (These settings are discussed later in this section).
5. You may now double-click the **"Start/Stop"** button to start cloning. You will be warned that continuing will modify your **Destination** drive. If you are ready to do this, choose "Yes" to continue.

   NOTE: When Clever Clone™ scales down an NTFS partition, it can only scale it to 55% of the original size.
6. Both drives will now power up. After a few seconds the unit will display a list of all **Source** partitions.
7. Touch the scroll icons to place the cursor by one single partition, and then touch the space to the left of the Volume Label multiple times to cycle among the 5 options. Master Manager uses the same cloning icons as Selective Clone Mode.

   NOTE: Please refer to Figure 3a above for descriptions on the different cloning options.
8. Press the **Start/Stop** button. After a few seconds, the **Destination** partitions (if any) are displayed.
9. Touch the Scroll icons to place the cursor by a **Destination** partition you want to overwrite, or scroll down to the "Add Partition" item. Touch the space to the left of the Volume Label to choose the desired partition or to add a new partition.
10. Hit the "**Start/Stop**" button to begin cloning.

DELL Optiplex™ Computers and Master Manager™

DELL Optiplex™ computers have a unique partition table that consists of a hidden "DELL Utility" partition in addition to the boot partition. These partitions can be cloned with Master Manager Mode, but only in a specific way:

1. When building a DELL Optiplex-compatible Master drive using Master Manager, the first partition cloned to the Destination drive should be a single Dell Utility partition.
2. Every partition after that can be a normal, bootable partition. They can even come from different DELL Optiplex™ PC's as the Dell Utility partition is the same from drive to drive.
3. Once the Master drive is built, you can then use Selective Partitions to clone it to other DELL Optiplex™ computers by selecting the Dell Utility partition along with the desired boot partition.

Cloning Windows Vista™

With the release of the Windows Vista™ operating system in late 2006, Microsoft has added some security features to protect the integrity of the partition. These features can cause problems when cloning Vista with Clever Clone mode.

This section will discuss the best ways to clone Windows Vista hard drives. These instructions apply to all flavors of Windows Vista (Windows Home Basic, Windows Home Premium, Windows Business and Windows Ultimate).

NOTE: Software dated November 2007 or later and NTFS Clever Copy mode need to be installed on the OmniClone® Xi in order to Clever clone Windows Vista.

Vista Installations

The following Vista installations are supported by Clever Clone mode:

- Upgrade of a Windows XP SP2 drive.
- Dual Boot scenario with Windows XP on the same partition.
- Installation on a blank drive.

As of this writing, the following Windows Vista scenarios are not yet supported by Clever Clone mode, but valid target drives can be cloned with Mirror Clone mode:

- BitLocker™ technology – a new drive encryption scheme by Microsoft.
- Other multi-boot scenarios (i.e. with Linux).
- The Windows Longhorn Server

NOTE: New software updates are constantly being developed. Please check with www.logicube.com periodically for new software updates.

Cloning Scenarios and how to handle them

A Simple Vista partition with logical drivers

No extra treatment is required to clone a simple Vista partition.

Vista with RE (Recovery Environment)

Assuming the RE partition is Hidden (type 0x27) as is specified by Microsoft, no special handling is required to yield bootable target drives. The OCXi will detect and copy the hidden RE partition correctly followed by a CleverCopy of the Vista bootable partition.

If the Recovery partition is of a simple (type 0x07) (non-hidden partition), a different cloning method is necessary. Ref. Figure 3b.

Choose Selective Partitions™ mode on the OCXi and assign the “Keep Size” method to the first (RE) partition, and regular Clever method to the Vista OS partition:

	1. RE	NT
	2. VISTA	NT

Fig 3b Selective partition Table

XP/Vista dual boot

XP partition comes before Vista partition: Use the Selective Partitions™ mode on the OCXi unit. Set the clone method to “Keep Size” for the XP partition and CleverCopy for the Vista OS partition.

Vista partition comes before XP partition: Use CleverCopy mode. No extra treatment is needed.

Selective Partitions™

Selective Partitions™ will work correctly with Master Manager drives provided they have been built according to the directive defined at he beginning of the Master Manager section above. It will also work

correctly with Vista drives that have multiple partitions. No special handling is required.

Master Manager™

In order to create a valid Master Manager™ drive with Vista partitions, it is absolutely necessary to apply the Bcdedit treatment to each Master drive prior to cloning.

It is OK to mix Vista and Non-Vista images on the same Master Manager™ drive.

NOTE: When building a Master Manager drive with Windows XP, 98 & 2K operating system partitions, you must edit the BCD (Boot Configuration Data) if Vista will be one of the partitions on the Master Drive you are creating. If so, follow the Master Drive BCD Vista Preparation below.

Master Drive BCD Vista Preparation

Edit the BCD (Boot Configuration Data) file in the following way:

1. Boot the Master drive and log in as a user with administrative rights.
2. Press the Start button (the Microsoft Orb) and type **cmd.exe** at the search window. The **cmd.exe** application will show up at the top of the box. Right-click it and run it as an administrator (or with elevated rights). A DOS window will open.
3. Now type the following commands in the DOS Window:

Bcdedit /set {bootmgr} device boot <enter>

Bcdedit /set {default} device boot <enter>

Bcdedit /set {default} osdevice boot <enter>

Bcdedit /set {memdiag} device boot <enter>

Bcdedit /set {ntldr} device boot <enter>
(this line is only necessary for drives with XP/Vista dual boot setup)

4. If typed correctly (with admin rights!), the response will be successful in each case. These commands change the BCD file in a way that allows Vista to boot even if some of the drive's geometry has changed. It will not cause a rollback, will not request the license key again, or perform a SID change pass.

5. Now shut down the computer and disconnect the Master drive. Your Master drive is now ready for cloning.

Reference

1st. Option - Master Drive BCD Vista Preparation

Edit the BCD (Boot Configuration Data) file in the following way:

1. Boot the Master drive and log in as a user with administrative rights.
2. Press the Start button (the Microsoft Orb) and type **cmd.exe** at the search window. The **cmd.exe** application will show up at the top of the box. Right-click it and run it as an administrator (or with elevated rights). A DOS window will open.
3. Now type the following commands in the DOS Window:

Bcdedit /set {bootmgr} device boot <enter>

Bcdedit /set {default} device boot <enter>

Bcdedit /set {default} osdevice boot <enter>

Bcdedit /set {memdiag} device boot <enter>

Bcdedit /set {ntldr} device boot <enter>
(this line is only necessary for drives with XP/Vista dual boot setup)

4. If typed correctly (with admin rights!), the response will be successful in each case. These commands change the BCD file in a way that allows Vista to boot even if some of the drive's geometry has changed. It will not cause a rollback, will not request the license key again, or perform a SID change pass.
5. Now shut down the computer and disconnect the Master drive. Your Master drive is now ready for cloning.

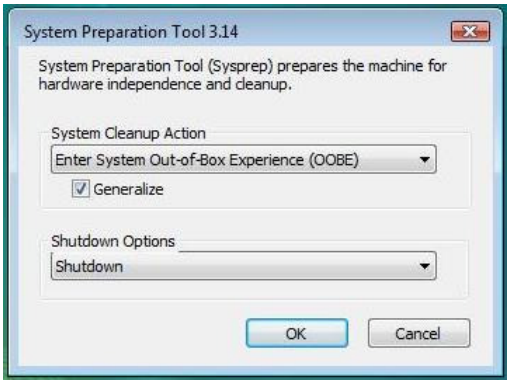
2nd. Option - Sysprep Instructions

This process "rolls back" the Master drive to the stage in the installation process just before entering the product license keys. To run:

1. Boot the Master drive and log in as a user with administrator rights.
2. Press the Start button (the Microsoft Orb) and type **c:\windows\system32\sysprep\sysprep.e**

xe at the **search** edit box. The **Sysprep.exe** file will be displayed at the top of the box. Right-click it and run it as an administrator (or with elevated rights).

3. Set the Cleanup Action to OOBE, and choose to Shutdown after the roll back, as shown in the following screenshot:



4. The “Generalize” switch is optional. It will not affect the success of the cloning process, but is recommended for the following reasons:
   - It will invoke the PnP mechanism of Vista upon booting the cloned targets. This is a good feature if the targets are to be placed in PCs of widely varying hardware devices (e.g. Video cards, network cards, motherboards, CPUs etc.).
   - It will force application of new SID values system-wide. This is desirable if two or more of the cloned drives will “live” in the same Active Directory domain.
5. The computer will turn off. Remove the Master drive, and do not boot it again. Your Master drive is now ready for cloning.

Optional Preference Settings

In addition the different cloning modes, there are preference settings that can be used to adjust the behavior of the cloning operation. Each of these preference settings is accessible through the

Settings menu, which can viewed at any time from anywhere in the menu system by pressing the Set button.

NOTE: Not all preference settings are available in every cloning mode.

Verify (PIO Speeds only)

The Verify preference allows you to choose whether the Logicube OmniClone® Xi scans the Target drives for bad or weak sectors. With Verify activated, the OCXi scans target drives during the cloning process. If a bad or weak sector is detected, the cloning process is aborted.

IMPORTANT NOTE: This setting does not perform data verification. Logicube recommends the use of Verification Stations for data verification of Target drives. Please refer to **Section 10 – Verification Station** for more information.

Verify Settings

- **No Verify** (Default) - No target drive scan is performed.
- **1% Verify** - Only the first 1% of the data sectors are scanned. This is faster but less thorough than using the All setting.
- **100% Verify** - Every data sector on the Target drive to which data has been written is checked.

NOTE: Logicube strongly recommends against using a hard drive that has been shown to have bad sectors as new defects are likely to develop.

Speed

The speed setting provides the option to set the speed at which an operation will be performed.

UDMA-5 - The software performs a test procedure to determine the fastest setting that the drives will tolerate while streaming data from one to the other. When set to UDMA-5, all lower speed grades will be tested (UDMA 0-4, PIO 0-4).

UDMA-4 - Force the unit to use at most this speed. Set the unit to this mode in some rare situations

where one or more drives do not support the higher speeds, and "misbehave" during automatic speed benchmarking.

UDMA-3 - Same as **UDMA-4.**

UDMA-2 - Same as **UDMA-4.**

UDMA-1 - Same as **UDMA-4.**

UDMA-0 - Same as **UDMA-4.**

PIO-Auto (PIO-4) – Force the unit to use this as the highest speed (PIO-4). Set the unit to this mode in some rare situations where one or more drives do not support higher speeds, and "misbehave" during speed benchmarking.

PIO-Medium – This is a fixed value that almost all drives will tolerate. It will result in copying speeds from about 200 to over 500 MB per minute depending upon the characteristics of the drives.

PIO-Slow – This is a speed value that all drives will be able to tolerate. It supports copying speeds from 100 to over 300 MB per minute depending on the characteristics of the drives.

NOTE: Use the MEDIUM or SLOW modes if you encounter drive "time-outs" or if you are cloning older drives. Many older 2.5" notebook drives require this setting.

PIO-CPU – This is an extremely slow speed value that all drives will be able to tolerate. It supports copying speeds from 15 to 20 MB per minute.

NOTE: CPU speed is designed for cloning DiskOn Modules, Compact Flash™ drives and other solid – state storage devices. It is only available in 100% Clone Mode.

Geometry

This Mode sets the geometry (**C**ylinder, **H**ead and **S**ector) translation used on the Target drive. CHS information is stored in the partition table of the hard drive and is used by the BIOS to determine from which partition to boot.

The correct setting will depend upon the capacity of the Target drive and on the BIOS of the PC in which it will be used. Check with the hard drive and PC manufacturer to determine which CHS mode is best as different BIOS systems use different translation methods for large (over 528 MB) capacity drives.

CHS Translation Modes

Following are the CHS translation modes supported by the OmniClone® Xi:

LBA (Default) – This CHS Mode will work for most hard drive and PC combinations and should be used unless otherwise indicated.

Large – Also known as Extended CHS (ECHS) mode. It is used on all Compaq and Samsung computers, some IBM PC's, IBM Thinkpad laptops, some newer Dell laptops, and possibly other computers. It should also be used whenever a Phoenix BIOS version 4.0 or earlier is encountered.

LBA 8.5 and **Large 8.5** – These settings force all partitions to remain below the 8 GB mark. This is useful with Legacy motherboards that cannot support drives larger that 8.5 GB.

LBA-1, **LBA-2, Large-1** and **Large-2** – These settings instruct the Logicube OmniClone® Xi to "shave off" one or two cylinders from the total drive size when constructing the Target partition tables.

NOTE: It is important to use -1 or -2 settings for most Windows 2000 and Windows XP installations. These operating systems use the unallocated space to store certain tables required for Active Directory and sometimes for Dynamic Partitioning.

NOTE: Most of the time, blocking out one cylinder is enough but two may need to be blocked out to achieve good results.

Security Identification Number (SID) Issues

The Windows NT, Windows 2000 (previously known as NT 5.0) and Windows XP operating systems attach a SID (Security Identification) number to all files and directories on the hard drive for security and authentication purposes. The same SID numbers are found in the system registry in various locations.

When such drives are cloned, the SID numbers get copied without change. If the Target drive participates in the same network as the Master, there will be a security breach, which will cause undesirable network behavior.

To avoid this issue with Windows NT and Windows 2000, we recommend a freeware SID changer called NewSID. The latest version can be down-loaded at www.sysinternals.com. Logicube is in no way associated with SysInternals and cannot offer any technical support for NewSID. Other commercial SID changers can also be found at major software outlets.

For Windows XP, you must use Microsoft's Sysprep utility, which is available as a free download from the Microsoft website at www.microsoft.com.

No matter which solution you choose, install the SID utility on the Master drive prior to cloning. That way, every cloned Target will have immediate access to it. NewSID can even be configured to run when the Target drive is first booted.

The NTFS Dirty Bit

The NTFS Dirty Bit is a bit that is saved on the NTFS partition. Its job is to let the Operating System know whether the volume has been shut down correctly. Upon reboot the OS examines that bit, and if set, it means that the Volume (partition) may be corrupt in some way. The OS then launches the Chkdsk utility to attempt to find the problems on the volume, and correct them in the process. It is a safety measure to correct potential data corruption from an improper shutdown.

By default, NTFS Clever Clone Mode sets the Dirty Bit during cloning to provide an extra layer of integrity checking when the Target drive is first booted.

Some customers might welcome that feature for copying drives that have been in use and their volume state is questionable. There is no harm in running Chkdisk on target drives, other then the extra time it takes on the first boot.

If dealing with newly installed master drives, it might be preferable to turn the feature off to reduce the time it takes to check cloned drives.

System integrators who wish to ensure every copy was perfectly cloned may wish to leave the setting on.

How to turn the feature on or off

Please refer to the section "*Dirty Bit for NTFS Clever Clone™*" in **Section 8 – Compact Flash (CF) Drive** for the procedure to turn the Dirty Bit on or off during cloning.

General Preferences

Introduction

Many of the settings that control overall functionality of the OmniClone® Xi are located in the General Preferences screen. Touching the General Preferences icon located at the lower left-hand corner of any other Settings screen can access this menu. General Preferences includes such functions as On Error, Set Option, Last Drive and other functions to be added later.

On Error (Optional)

The On Error setting is a feature that is part of the Omnidiagnostics™ option. It determines the behavior of the unit in the case where bad spots are detected on the Master drive. This setting has four options, which include:

Abort - The default setting is Abort. This mode will cause the Logicube OmniClone® Xi to halt if an error such as a bad drive sector is encountered.

Skip - Skip will allow the Logicube OmniClone® Xi to continue by stepping over the bad sector.

Retry - Retry option will instruct the Logicube OmniClone® Xi to make several attempts to read data from the damaged area of the drive.

Recover - Recover will attempt to recover as many bytes of data as possible from each bad sector that is encountered

NOTE: data in any skipped sectors will NOT be copied to the Target drive.

NOTE: The Omnidiagnostics™ option must be installed before the On Error settings can be accessed.

On Error Step-by-Step

1. From anywhere in the menu system, press the **Set** button to enter the Settings menu.
2. Touch the **"General Preferences"** icon located in the lower left hand corner of the screen.
3. Touch the **On Error** icon repeatedly to toggle between the different On Error setting options: **Skip, Abort, Retry** and **Recover**.
4. After the On Error setting is chosen, exit the General Preferences screen by touching the **Back** icon. This will take you back to the previous Settings screen.

NOTE: The OmniClone® Xi checks the Master drive for bad or weak sectors during any cloning operation. It will not check the Target drives unless the **Verify** setting is set to **1%** or **100%**.

Set Option

All optional software packages are already inside your Logicube OmniClone® Xi (and are automatically updated when you install a newer software version). To use an option like NTFS Clevercopy, Selective Clone, Master Manager or Omnidiagnostics™, it first needs to be enabled.

To enable Omnidiagnostics™ on your OmniClone® Xi, contact Logicube to purchase a license key that is unique to your unit. Once you have obtained the license key, follow this procedure to enter it into your Logicube OmniClone® Xi.

Set Option Step-by-Step

1. From anywhere in the menu system, press the **Set** button to enter the Settings menu.
2. Touch the **"General Preferences"** icon located in the lower left hand corner of the screen.
3. Touch the **Set Option** icon, a numeric keypad will come up. Type in the 7-digit code that you received from Logicube. Press **OK** when finished.
4. If the code is typed in correctly, a message reading "Option Enabled" will appear. The unit will then reboot.
5. If the code is entered incorrectly, the display will go back to the General Preferences screen.
6. If you cannot enter the code, exit the General Preferences screen by touching the **Back** icon. This will take you back to the previous Settings screen.

Last Drive

This setting allows the user to determine the maximum number of Target drives that can be cloned on the OmniClone® Xi unit at one time. For example, an OC10Xi that normally clones 10 Target drives can be set to clone 5 drives. The first 5

Target positions would be active while the remaining Target positions would be turned off. This reduces the cloning time slightly because the unit knows not to access drive positions that are not used.

Last Drive Step-by-Step

1. From anywhere in the menu system, press the **Set** button to enter the Settings menu.
2. Touch the **"General Preferences"** icon located in the lower left hand corner of the screen.
3. Touch the **Last Drives** icon, a numeric keypad will come up. Type in the maximum number of drives that you wish to clone. The number can range from 1 to 10. Press **OK** when finished.
4. Exit the General Preferences screen by touching the **Back** icon. This will take you back to the previous Settings screen.

Database

This setting is covered in **Section 5: The Database/Barcode Option**.

Password

This setting is used to set a password that restricts access to the OmniClone® Xi unit. If a password is set, then every time that the unit is rebooted a password prompt will come up. As long as the user enters the correct password the unit will boot to the Main Splash Screen.

Setting a Password Step-by-Step

1. From anywhere in the menu system, press the **Set** button to enter the Settings menu.
2. Touch the **"General Preferences"** icon located in the lower left hand corner of the screen.
3. Touch the Password icon. If a password is not already set then an alphanumeric keypad will come up.
4. Enter a password that is nine characters or less. Do not use spaces or unusual characters.

5. Touch the OK key when done, the unit will reboot itself to the Password Entry Prompt.
6. Type in the password to access the Main Splash Screen.

Removing a Password

A password can only be removed by reloading the software on the OmniClone® Xi unit. Please refer to **Section 12: Software Loading Instructions** for more details.

4. Omnidiagnostics™

Introduction

Omnidiagnostics™ is a powerful set of features that aid in the recovery and repair of drives with bad or weak data sectors, and in the secure erasure of sensitive data.

NOTE: Omnidiagnostics™ is an option that can be purchased for your OmniClone® Xi unit. Please contact Logicube if you wish to purchase any of the option packages.

Omnidiagnostics™ Features

Scan Target Mode

Scan Target mode scans the Target drives for weak and bad data sectors. It uses the Read-Verify command of the ATA specification to detect bad or weak spots on the Target drives. When a suspect area of the drive is detected, a sector-by-sector analysis is performed.

If a given sector is read incorrectly one or more times out of 10 tries, it is considered to be weak. If it is read incorrectly 10 times out of 10, it is considered to be bad.

Any drive that shows weak sectors should be returned to the manufacturer or retired due to the higher risk of potential data loss.

When using Scan Target mode there are two levels of scanning speed to choose from:

- **Fast** (Default) – This is the fastest.
- **Thorough** – This is the most thorough.

The Thorough operation writes patterns to some sectors, which can cause data corruption. Use this setting only when data loss is not an issue.

Scan Target Mode Step-by-Step

1. From anywhere in the menu system, press the Set button to enter the Settings menu.
2. Press the Cloning Mode icon that appears in the upper left-hand corner. A list of the available cloning modes appears.
3. Press the **"Scan"** icon, the Scan Target™ settings screen will appear.
4. Adjust the **"SPEED"** setting as needed.
5. You may now double-click the **"Start/Stop"** button to start cloning. You will be warned that continuing will modify your **Destination** drive. If you are ready to do this, choose "Yes" to continue.
6. When finished, the Logicube OmniClone® Xi will notify you and display a list of the scanned drives along with bad or weak sectors found on each drive.
7. After reviewing the summary, touch the Back icon to return to the main menu.

Repair Target Mode

Repair Target mode scans Target drives using a Logicube exclusive algorithm in an attempt to repair all weak and bad sectors encountered. Please note that this process can take a long time.

The Repair Target operation directly manipulates the contents of the Target drive with no effort being made to retain the original data. It does not prompt the user when a bad sector is reallocated so any data on a repaired sector is lost.

Repair Target Mode Step-by-Step

1. From anywhere in the menu system, press the Set button to enter the Settings menu.
2. Press the Cloning Mode icon that appears in the upper left-hand corner. A list of the available cloning modes appears.

3. Press the **"Repair"** icon, the Repair Target™ settings screen will appear.
4. You may now double-click the **"Start/Stop"** button to start cloning. You will be warned that continuing will modify your **Destination** drive. If you are ready to do this, choose "Yes" to continue.
5. When finished, the Logicube OmniClone® Xi will notify you and display a list of the scanned drives along with bad, weak and repaired sectors found on each drive.
6. After reviewing the summary, touch the Back icon to return to the main menu.

WipeClean™ Target Mode

The WipeClean™ Target mode erases all data on the Target drives. This may be required when discarding drives that contain sensitive information to which you do not want others to have access, e.g. financial information, trade secrets, etc.

WipeClean™ writes a pattern over the whole Target drive **2 X n+1** times, where n is the selected number of iterations of all 0's and all 1's. The last pass then writes the chosen pattern to every byte of the drive.

For example, if you set the Value to "0xff" and the number of iterations (the value of n in the above formula) to 1, WipeClean™ will perform a total of three passes, first writing all 0's then again writing all 1's. Then one more pass will be made that leaves a repeating "FF" pattern.

By default, WipeClean™ is set to erase data according to Department of Defense (DoD) specification M-5220. This setting is 3 passes and a final pattern of "0xF6".

Set the number of passes to 0 for a single pass of the chosen pattern. This method is acceptable for quickly wiping a drive where removal of sensitive information is not an issue.

WipeClean™ Settings

The following settings are used in configuring WipeClean™ Target mode:

Passes – Determines how many passes of all 0's and all 1's are written to the drive. The default is 1 for compliance with DoD 5220.22-M

Value – Select the value to be written on the last pass. The options are 0xf6, 0x00, 0xff, and Random

(DoD default). (The Random setting will fill the Target drive with a pseudo random pattern.)

Speed – The speed can be manually set from UDMA 5 to PIO-SLOW.

NOTE: The unit will run at the fastest possible speed as long as a drive is attached to the Master position. This should not be an actual Master drive as a pattern will be written to part of the drive and it will be rendered unbootable.

If no drive is attached to the Master position the unit will still wipe the Target drives, but it will run at speeds ranging from 60 – 100 MB/min.

Wipeclean™ Target Step-by-Step

1. From anywhere in the menu system, press the Set button to enter the Settings menu.
2. Press the Cloning Mode icon that appears in the upper left-hand corner. A list of the available cloning modes appears.
3. Press the **"WipeOut"** icon, the Wipeclean Target™ settings screen will appear.
4. Touch the "**Passes**" icon to set the number of passes. Use the numeric keypad to enter the number of passes. Press OK when finished.
5. Touch the "**Value**" icon to scroll through the different patterns.
6. Touch the "Speed" icon to choose the best speed, if necessary.

   NOTE: The unit will automatically adjust itself to the best speed for the attached drives.
7. Press the Start/Stop button twice.
8. A message will appear stating that portions of your Target drive will be overwritten. If you are prepared to continue, choose "<Yes>". If you wish to abort the operation, choose "<No>".
9. If "<Yes>" is chosen, a second message will appear stating that you are about to erase the Target. If you wish to continue, choose "<Yes>". If you want to abort the operation, choose "<No>".
10. If "<Yes>" is chosen, the WipeClean™ Target operation will begin and a status screen will appear.
11. The Logicube OmniClone® Xi will notify you when erasing is complete. Press the Back icon to return to the main menu.

5. The Database/Barcode Option

Introduction

The Logicube Database/Barcode Option gives your OmniClone® Xi the ability to record vital cloning information and store it on the Compact Flash (CF) drive. This information is stored in a format that is easily read by most Database programs (i.e. Microsoft Excel, Microsoft Access, dBase, etc.). The information is gathered from the cloning session, drive firmware and the optional Barcode Scanner.

NOTE: The Database/Barcode option can be purchased for your OmniClone® Xi unit. Please contact Logicube if you wish to purchase any of the option packages.

System Contents

When the Logicube Database/Barcode option is purchased, it comes with the following items:

- A Barcode Scanning Wand, (this plugs into the PS/2 connector in front of the OmniClone® Xi).
- A User's Manual for the Barcode Scanner.
- A User's Manual for the Database™ option.
- A sheet that contains the code to unlock the Logicube Database™ option.

NOTE: Step-by-step instructions for unlocking the option are discussed under "*Set Option*" on page 31.

Compact Flash (CF) Files

The Logicube Database/Barcode option adds two files to the Compact Flash (CF) drive. The two files are *Config.txt* and *DAT###.csv*.

Breakdown of Config.txt

Information collected by the Database option is governed by a "**Config List**". This list contains all of the items that the Database will record. It also indicates whether or not the Barcode Scanner is used. Config lists can be created with the OmniClone® Xi, (or from a text editor like *Notepad.exe*). The lists are stored together in a file called **Config.txt**. This file is stored on the CF drive.

A Config List with all of the options chosen looks like the list below:

[Title]

IncludeHeaders

UnitSN

UnitFirmware

Scan1-OperatorBadge

Scan2-BatchNo

Scan3-Location

Time

Date

MasterModel

MasterSerial

TargetModels

TargetSerials

Mode

Outcome

Master MD5

Target MD5

[Title] - This is a user-entered name for the Config List. The name should be 18 characters or less.

IncludeHeaders – If this line is included, it tells the Database to put headers as the first line of data in the Database.csv file.

UnitSN – This is the serial number of the OmniClone® Xi unit.

UnitFirmware – This is the OmniClone® Xi's current Firmware.

Scan1-UserEnteredName1 – This is the first line of information collected by the Barcode Scanner (i.e. Operator's Badge Number). The entered name needs to be 18 characters or less.

Scan2- UserEnteredName2 – This is the second line of data collected by the Barcode Scanner (i.e. Batch Number). The entered name needs to be 18 characters or less.

Scan3- UserEnteredName3 – This is the third line of information collected by the Barcode Scanner (i.e. Location Number). The entered name needs to be 18 characters or less.

Time – This records the time that the cloning session completed. The time comes from the OmniClone® Xi's own internal clock.

Date – This records the date from the unit's internal clock.

NOTE: Please refer to "*Time/Date Settings*" in **Section 3: Cloning Modes and Settings** for more information on how to set the internal clock.

MasterModel – This line records the Model Number of the Master drive.

MasterSerial – This line records the Serial Number of the Master Drive.

TargetModels – This line records the Model Number of each Target drive connected to the OmniClone® Xi.

TargetSerials - This line records the Serial Number of each Target drive connected to the OmniClone® Xi.

Mode – This line records the Cloning Mode used (i.e. Clever, Mirror, etc.)

Outcome – This records whether or not the cloning session was completed successfully. It will either say **SUCCESS** or **FAIL**.

MasterMD5 – This records the MD5 hash value of the Master drive.

TargetMD5 – This records the MD5 hash values for each of the Destination drives by position location.

Database.csv

The Logicube Database™ option writes all of the collected information for a given operation to incremental files named *DAT###.csv*. The "csv" extension stands for "comma separated values" and is a common Database format. It can be read by most Database programs (i.e. Microsoft Excel, Microsoft Access, dBase, etc.). These files start at DAT000.csv and are stored on the Compact Flash (CF) drive.

A typical .CSV file opened in a text editor looks something like this:

```
Time, Date, MasterModel, TargetModels-1, TargetModels-2, TargetModels-
3, TargetModels-4, TargetModels-5, TargetModels-6, TargetModels-7,
TargetModels-8, TargetModels-9, TargetModels-10, Mode, Outcome,
5/18/05, WDC WD400BB-22HEA1, ST380023AS, NA, NA, NA, NA, NA, NA, NA,
NA, NA, Mirror, SUCCESS, MasterMD5, TargetMD5
```

NOTE: Cloning session data will continue to be stored as incrementing DAT###.csv files until they are deleted from the CF drive, at which point the next new set of data will be stored as DAT000.csv. If a Config List change is necessary, the DAT###.csv will increment by one to the next unused file number and the session will be stored on the CF drive normally.

Database Step–by-Step

NOTE: This procedure goes from attaching the Barcode Scanner to choosing a Config List to running the cloning session and collecting the DAT.csv file. It is a basic rundown of the Database process. Details such as the menu options and the Barcode Scanner will be discussed later in the section.

1. Attach the Barcode Scanner to the PS/2 Port on the front of the OmniClone® Xi unit.
2. Insert the Compact Flash (CF) Drive in the CF Slot and power up the unit.
3. From the Main Screen, press the **Set** button.
4. Touch the **General Preferences** icon in the Lower left-hand corner of the screen.
5. Touch the **Database** icon. This will open the Database Settings Menu.

   NOTE: If the Database/Barcode option is not enabled, a warning message will appear and the Database Menu will not open.
6. Touch the **Select Config** icon. It will bring up all of the Config Lists that are stored in the Config.txt file that is on the CF Drive.
7. Touch the desired Config List. A check mark will appear next to it. Touch **OK**.

   NOTE: Once a Config List is chosen, the name of the list will appear at the top of the Database Menu.
8. Touch the **Database** icon to set it to ON, (the default is OFF).

9. Touch the **Back** icon twice to go back to the Cloning Settings Menu. Change the settings as desired.
10. Press **START**/**STOP** to begin cloning.
11. When the first cloning Session is finished, the unit will write data to a file called DAT000.csv. The (Optional) Database software will increment subsequent session file names by one prior to storing files to the CF drive. If one or more "Scan" lines are in the Config List, then the User will be prompted to use the Barcode Scanner.

Fig 4. Barcode Scan Prompt

12. When prompted, aim the Barcode Scanner at the Barcode to be read. Hold the scanner at an angle about 6 – 8 inches from the barcode. Hold down the trigger until the Scanner beeps.
13. After the data is collected, the unit will stop with a "clone successful" message.
14. At this point the DAT###.csv file can be copied from the CF drive and imported into the Database program of your choice. Use USB Mode to gain access to your CF drive.

Database Settings Menu

The Logicube Database™ Menu is made up of five different settings:

Select Config – This setting allows the user to choose a Config List from the *Config.txt* file. A checkmark appears next to the selected list.

On the *Config.txt* file itself, the active list is denoted by an asterisk (*) located next to the list title.

Database Off/**On –** This setting tells the OmniClone® Xi to run the Database function during the next cloning session. It will continue to do so until the setting is turned off.

Printer Menu – This setting prints the collected data through a printer that is connected to the parallel port of the OmniClone® Xi. When opened, this setting will prompt the user to enter the number of entries to be printed. For example, if 20 clones

have been performed with the Database turned on, the user can select any number of entries up to 20.

NOTE: Any standard printer can be used as long as it is able to print from plain ASCII codes.

Manage Database – This allows the user to delete one or more Config Lists from the Config.txt file.

Create Config – This setting allows the user to create a new Config List. Once the list is finished, it is saved to the Config.txt file.

Creating a New Config List, Step-by-Step

1. From the Main Screen, press the **Set** button to go to the Settings Menu, then touch the **General Preferences** icon, followed by the **Database** icon. Once in the Database Menu, touch the **Create Config.** icon.
2. Touch the checkbox next to each line of data you want to add to the Config List. When the line is selected, a checkmark will appear.
3. When the "Scan1", "Scan2" or "Scan3" lines are chosen, an alphanumeric keypad will come up on the touch screen. Enter a label for the Scan line and touch OK when finished. This label is later used in the Scan prompt that appears at the end of the cloning session.

NOTE: Pressing the ALT button on the alphanumeric keypad will bring up lower-case letters. Pressing ALT again will bring up numbers as well as special characters ($, %, &, etc.). Pressing ALT again goes back to capital letters.

4. Once the desired lines have been chosen, touch OK to go to another alphanumeric keypad. Enter a title for the Config List.

NOTE: Config List names as well as Scan Line labels can be 18 characters or less (including spaces).

5. Once a name has been entered, touch OK to go back to the Database Settings screen.

NOTE: Config Lists can also be created or modified with a Text Editor in a PC (i.e. Notepad.exe for Windows). Make sure that the correct formatting is followed if this method is used.

Barcode Scanner

The Barcode Scanner is used to enter data that is not accessible from inside the OmniClone® Xi unit. The data could include things such as an Operator Badge number or other data that is in barcode form.

As of this writing, the Barcode scanner wand that ships with the Database/Barcode option is a CCD-LR (Long Range) Scanner made by Wasp Technologies (Model # WLR-7100).

Barcode Scanner Settings

The Barcode Scanner is designed to plug into the OmniClone® Xi and work without any special settings. However, there are a few basic settings available to customize the Barcode Scanner.

To use the settings below, just scan them with the Barcode Scanner while it is plugged into the OmniClone® Xi unit and powered up. The scanner will emit a double-beep when it reads the barcode.

NOTE: The Database™ function does not need to be running for the Barcode scanner to scan Factory Settings.

Factory Default – Scan this barcode to set your Barcode scanner back to the factory default settings.

Autosense Stand Mode – Scan this barcode to enable the “Hands-Free Autosense” feature of your Barcode Scanner. This allows the user to use the scanner without pressing the trigger or holding the wand. Scan the Factory Defaults barcode above to disable the feature.

NOTE: A hands-free stand is available from Wasp Technologies.

Beep Settings – These settings change the volume level of the "beep" that the scanner emits when it successfully reads a barcode.

Enable Bar Code Symbiologies – This setting allows your scanner to read all types of barcodes (i.e. UPC-A, UPC-E, EAN-13, etc.). This setting may be necessary if you are utilizing an unusual barcode type.

NOTE: Advanced barcode settings are available in the User's Manual that is included with your Barcode Scanner. It is not advised to use these settings as they may interfere with the functionality of the Barcode Scanner on the OmniClone® Xi.

6. The Serial Link Option

Introduction

The Logicube Serial Link Option gives your OmniClone® Xi the ability to receive commands from a PC. This allows the operator to control the unit from a remote terminal, and even control multiple units from the same terminal.

NOTE: The Serial Link option is available on OmniClone® Xi software ver. 1.18 or later.

NOTE: The Serial Link option can be purchased for your OmniClone® Xi unit. Please contact Logicube if you wish to purchase any of the option packages.

System Contents

When the Logicube Serial Link option is purchased, it comes with the following items:

- A 6-foot proprietary Serial Cable.

  NOTE: 10-foot Serial Cables are also available.

- A sheet that contains the code to unlock the Logicube Serial Link option.

NOTE: Step-by-step instructions for unlocking the option are discussed under "*Set Option*" on page 31.

Setup

Setting up the Serial Link connection is very easy and comprised of three basic steps: Connecting the Serial Cable to the PC, Configuring Hyper Terminal and then powering up the OmniClone® Xi.

Serial Link Setup Step-by-Step

1. Verify that the Serial Link option is enabled on the OmniClone® Xi by checking the About Screen.
2. Power the OmniClone® Xi unit OFF.

3. Connect one end of the Serial Link cable to the ps/2 port on the OmniClone® Xi.
4. Connect the opposite end of the cable to the serial port of a PC running Windows XP or later.
5. On the PC, bring up Hyper Terminal by going to Start – All Programs – Accessories – Communications – Hyper Terminal.
6. Choose "File - New Connection" or follow the connection wizard if it comes up automatically.
7. Name the Connection "OCXI_01" and choose an icon.
8. In the next screen, choose the highest COM port. You can also refer to Windows Device Manager to determine the correct port.
9. In the next screen, set Bits Per Second: 9600, Data Bits: 8, Parity: None, Stop Bits: 1 and Flow Control: Xon/Xoff.
10. In the HyperTerminal Window, be sure to Save the connection as "OCXI_01".
11. Power up the OmniClone® Xi unit. A “welcome message” will appear on the Hyper Terminal window.
12. Before entering commands, make sure that the CAPS LOCK key is engaged on the PC. All commands are upper case.

    NOTE: Multiple OmniClone® Xi units can be controlled from the same PC provided that it has enough Serial ports to connect the different units. Since each unit will be on a separate COM port, just create a new Hyper Terminal connection for every Omniclone unit and name them “OCXI_02”,”OCXI_03”, etc.

Serial Link Commands

The Serial Link commands are as follows:

? – Displays a list of all supported commands.

I – Displays information about the unit like serial number, software version, etc.

C – START/STOP button. Press C twice to start a cloning session and once more during the session to abort.

S – Set button. Accesses the Setup menu.

B – Back Button. Acts like the Back icon on the unit.

M – Forces the unit to use 100% Mirror clone mode with no Verification.

V – Sets Verify to 100% (All). Pressing M sets it back to None.

Nxxx – Sets the percentage of the Mirror Clone to a number between 000 and 100%. For Example:

- 010 = 10% from front of Master
- 042 = 42% from front of Master
- 003 = 3% from front of Master

T – Provides current status of the cloning session: **READY**, **BUSY** or **DONE.**

P – Shows progress information of a cloning session (speed, percentage complete, etc.) Only useful when the unit is **BUSY**.

R – Provides a printed report at the end of the session. It only works when the status of the cloning session is **DONE**. Printed report is similar to the report generated by the Database option (see Section 5 – Database Option for more details).

U – Sets the unit to USB mode so that the Compact Flash (CF) drive is accessible through Windows. Only useable when the unit is not cloning.

NOTE: Starting a cloning session will automatically turn off USB mode.

O – Turn USB mode OFF and disconnect CF drive from Windows (without starting a cloning session).

5 – Set unit to use MD5 Verification Mode. See **Section 10 – Verification Station** for more details.

W – Read back all MD5 final results after a successful MD5 Verification session. See **Section 10 – Verification Station** for more details.

Other Notes

- Commands are case sensitive and must always be in CAPS.
- You can mix Serial Link commands with actual button and touch screen presses on the unit itself.
- Each command that is successfully received by the unit will echo back to the PC in <> brackets. Example: <C1> means that a successful Start command was sent to the OmniClone® Xi unit.

7. Using the USB Port

Introduction

The integral USB port on your Logicube OmniClone® Xi provides connectivity of your CF drive or Master hard drive (the unit's Master drive) to any USB-enabled PC. Both USB 1.1 and USB 2.0 are supported.

USB connectivity is available for the Master drive only. It allows the drive to connect to Windows as an external USB drive. If the Master partition is readable by Windows it will receive a drive letter and then can be accessed through Windows like any other drive.

Minimum requirements

- A Logicube OmniClone® Xi unit with integral USB port.
- A 586 or better PC compatible computer with a floppy or CD-ROM drive.
- An available USB port on the PC. USB 1.1 and USB 2.0 are automatically supported.
- Microsoft Windows 98/98SE/ME/2000/XP operating system (for drive access under Windows).
- A floppy disk or CD-ROM with Windows 98/98SE USB drivers installed. No drivers need be installed for ME/2000/XP.

How to use under Windows (for Master Drive Management)

1. Make sure a Master drive is properly attached to your Logicube OmniClone® Xi.
2. Make sure your PC is running Win98 or above.
3. Connect the USB cable (provided) to a PC USB slot on one end. Do not attach the other end to the Logicube OmniClone® Xi yet.
4. Set the Logicube OmniClone® Xi to USB mode:
5. From anywhere in the menu system, press the Set button to enter the Settings menu.
6. Press the Cloning Mode icon that appears in the upper left-hand corner. A list of the available cloning modes appears.
7. Press the **"USB Mode"** icon, The Logicube OmniClone® Xi will power up the Master drive. A prompt will appear saying that it is safe to attach the USB Cable.
8. Attach the USB cable to the Logicube OmniClone® Xi. You should now see some activity on your PC screen, which depends on the operating system.
9. If running ME/2000/XP your drive will automatically be mounted and drive letters assigned to all recognizable partitions.
10. If running 98/98SE you will be prompted to install drivers. At the "have disk…" prompt please point the PC to the drivers folder of the CD-ROM (provided), and the installation should complete smoothly.
11. The Master Drive is now visible on Windows as an external drive. Any partitions that can be accessed by your Operating System will be assigned a Drive Letter.

Removing USB devices

Before physically disconnecting the USB cloning adapter and/or shutting down power to the Logicube OmniClone® Xi, the unit has to be properly "unmounted" from Windows. To do that:

1. Locate the USB icon in the system tray (typically at the bottom right of screen).

2. Click the icon once.

3. Wait for Windows to bring up a message that it is safe to remove the device. (Different versions of windows will behave slightly differently).

8. Compact Flash (CF) Card

Introduction

The Logicube OmniClone® Xi comes with a 64MB Compact Flash (CF) Drive that is inserted in a CF slot at the back of the unit. This little drive is used mostly for loading software on the Logicube OmniClone® Xi, but it has other functions such as storage for the Database/Barcode Option and home for the User – configurable CONFIG.INI file.

NOTE: It is highly recommended that the CF Card be left inside the OmniClone® Xi for optimal performance.

NOTE: Please check our website periodically at www.logicube.com, any new CF functions will be posted there.

To load new software from the CF Drive, please refer to the procedure "**Loading Software Using the Compact Flash**" which is found in **Section 12: Software Loading Instructions.**

Inserting and Removing the Compact Flash

1. At the back of the Logicube OmniClone® Xi is a Compact Flash (CF) slot. Make sure that it is clear.
2. Hold the CF Drive so that the Logicube label faces up.
3. Slide the CF Drive into the CF slot. As it slides into place, the eject button will slide out.
4. To remove the CF Drive, simply press in the eject button. The drive will slide out.

Connecting the CF Drive to Windows via USB

This is necessary to load new software files to the CF Drive. The CF drive is connected through Windows via the Software Setup Screen.

Connecting Through the Software Setup Menu

USB connectivity is available for the CF drive through the Software Setup Screen. This screen resides in the unit's Firmware and is not affected by the software.

1. Make sure your PC is running in Windows 98 or above.
2. Connect the USB cable (provided) to a PC USB slot on one end. Do not attach the other end to the Logicube OmniClone® Xi yet.
3. Boot The Logicube OmniClone® Xi while holding down the **Start**/**Stop** button. The unit will boot to the Software Setup Menu.
4. Use the **Select** button to Scroll down to "Engage CF to USB". Press the **Start**/**Stop** button.
5. A prompt will appear saying that the unit is in USB Mode.
6. Attach the USB cable to the Logicube OmniClone® Xi. You should now see some activity on your PC screen, which depends on the operating system.
7. If running ME/2000/XP your drive will automatically be mounted and a drive letter will be assigned to it.
8. If running 98/98SE you will be prompted to install drivers. At the "have disk…" prompt please point the PC to the drivers floppy (provided), and the installation should complete smoothly.
9. The CF Drive is now visible on Windows as an external drive. You can copy software update files, or anything else to/from the drive.

Removing USB devices

Before physically disconnecting the USB cloning adapter and/or shutting down power to the Logicube OmniClone® Xi, the unit has to be properly "unmounted" from Windows. To do that:

1. Locate the USB icon in the system tray (typically at the bottom right of screen).

2. Click the icon once.

3. Wait for Windows to bring up a message that it is safe to remove the device. (Different versions of windows will behave slightly differently).

Config.ini File

This file resides on the CF drive and allows the User to control two different functions:

1. Turn the audible buzzer ON and OFF.
2. Turn the "Dirty Bit" Activation ON or OFF.

Audible Buzzer

The OmniClone® Xi's Light Bar has an audible buzzer that sounds whenever a cloning session is complete or the unit stops with an error.

This buzzer can be turned ON and OFF in the Config.ini file:

1. Turn the buzzer ON by setting **Buzzer=1**.
2. Turn the buzzer OFF by setting **Buzzer=0**.

Dirty Bit for NTFS Clever Clone™

The "Dirty Bit" on an NTFS partition tells it to run Chkdsk on the next boot. This feature is handy to fix any errors that might be cloned to the Target drive from the Master; however it does increase the time of the cloned Target drive's first boot.

This feature can be turned ON and OFF in the Config.ini file:

1. Turn the Dirty Bit ON by setting **DirtyBit=1**.
2. Turn the Dirty Bit OFF by setting **DirtyBit=0**.

9. User Replaceable Hardware

Introduction

Many of the components that make up the Logicube OmniClone® Xi are designed to be removable by the user. This includes drive cables, drive stations and even the power supply itself. This is beneficial in a production setting where a company cannot afford to send in an entire 10-Target duplication unit to repair one drive station. Instead, Logicube can ship a new drive station module and the user can install it in less than one minute.

NOTE: Users who operate the OmniClone® Xi unit in a large production setting are advised to keep spare cables, drive stations and even an extra power supply handy in case of emergency.

Drive Cables

The UDMA, power and SATA Cables that connect Master and Target drives to the OmniClone® Xi are designed to withstand up to 500 insertions/extractions. This means that through proper handling, the cables can be pulled off and attached to 500 different drives before the heads start to wear out. Improper handling of the cables can cause this number to go down significantly.

Because the drive cables have a significant shelf life, they are considered consumable items and are not covered under the same warranty as the OmniClone® Xi unit. Please contact Logicube Sales if you need to purchase replacement cables.

Proper Handling of Drive Cables

UDMA Cables – When removing the cable from a drive, be sure to pull on the white tab that is attached to the head. DO NOT pull on the cable itself as this will diminish cable life.

Power cables – Remove the cable from the drive by gripping the white plastic head firmly and pulling straight out. Do NOT pull on the wires as this will damage the cable.

SATA Cables – Remove the cable from the drive by gripping the black plastic head firmly and pulling straight out. DO NOT twist or pull by the cable as this will shorten cable life.

Drive Stations

The "Drive Stations" of the OmniClone® Xi refer to the connection plates of each Master and Target position. These plates are very rugged and able to withstand thousands of cloning sessions. However, damaged or incorrectly connected drives can damage the Drive Station. When this occurs, the station can be easily replaced by the user.

Replacement Drive Station Modules are available from Logicube. Please contact Logicube Sales for more information.

Removal and Installation of a Drive Station

1. Turn off the power to the unit and unplug the power supply cord.
2. Remove the drive and any cables from the non-functional Drive Station.
3. Loosen the two thumb-screws located on either side of the Drive Station.
4. Pull straight up on the thumb-screws, the Drive Station should come right out.
5. Installation of the Drive Station is the opposite of removal.

Power Supply

The OC10Xi and OC5Xi models have an internal power supply that can also be replaced by the user. When it is determined that the power supply needs to be replaced, please follow the procedure below:

Replacement Power Supplies are available from Logicube. Please contact Logicube Sales for more information.

NOTE: The Omniclone® 2Xi uses a separate power supply that is not physically connected to the unit.

Removal and Installation of the Power Supply

1. Remove the AC Power Cord from the power supply.
2. Remove the two screws located on either side of the Power Supply.
3. Turn the unit over and remove the six screws that hold the power supply to the bottom of the unit.
4. Lift up on the power supply module to remove it from the unit.
5. Disconnect the cable harness from the main circuit board.
6. Installation of the Power Supply is the opposite of removal.

10. Verification Station

Introduction

The Logicube Verification Station is designed to attach directly to your OmniClone® Xi HDD Duplication device. It looks and acts like the standard Drive Station except that it has an additional feature. The Verification Station is able to scan a drive and verify the data of a set number of sectors.

The Logicube Verification Station uses an MD5 algorithm to verify the Target drive data. It compares the MD5 Hash value of each drive to a set value that is loaded to the OmniClone® Xi's CF drive by the user. It will display a PASS/FAIL message after comparison.

The ten Target positions operate independently of one another even though they are accessed from the same control panel. This allows for faster scanning speeds and prevents a slower drive from holding back any faster drives.

NOTE: The Verification Station cannot verify a drive in the Master position. It only works in one of the Target positions.

How to Install

NOTE: A Verification Station must be installed in the target # 1 position of the OmniClone® Xi for MD5 verification capability.

1. Turn off the power to the OmniClone® Xi and unplug the power supply cord.
2. Remove the drive and any cables from the Standard Drive Station.
3. Loosen the two thumb-screws located on either side of the Drive Station.

4. Pull straight up on the thumb-screws, the Drive Station should come right out.

5. Insert the Verification Station into the now-empty slot. Make sure that the IDE-style connector on the bottom of the Combo Station lines up with the socket inside the OmniClone® Xi unit.

6. Tighten the two thumb-screws on either side of the Verification Station.

7. Repeat Steps 1 – 6 for any other Verification Stations that need to be installed.

   NOTE: The Verification Stations can only be used in the Target positions on the OmniClone® Xi.

Generating the Master MD5 Hash Value

The Logicube Verification Stations compare each drive with a "Gold Master" MD5 Hash Value. This value is generated on the Master drive, and stored in a file called "checksum.txt" that resides on the Compact Flash (CF) Drive of the OmniClone® Xi. After a Mirror Cloning session, the Target drives should all have MD5 values that match the Gold Master.

There are different ways of generating the MD5 Hash Value of the Gold Master drive:

1. Place the Master Drive on the target #1 position Verification Station. To use Checksum Mode to generate the MD5 Hash;

   - Press the SET button on the OmniClone® Xi unit
   - Press the current cloning mode icon; a mode menu will appear
   - Change the Mode to MD5 Checksum Mode
   - Select "Verify MD5 Checksum" (default)
   - Select "Create MD5"
   - Press START twice
   - When the MD5 hash has completed, a text file named "CHECKSUM.TXT" will be created and will be written to the system CompactFlash (Note: The CHECKSUM.TXT

file will be overwritten each time the user re-generates or generates another drive)

- Please refer to the section “Preparing the CHECKSUM.TXT file” later in this section for information on how to open and view the CHECKSUM.TXT file
- Note: To prevent overwriting remove the Master drive after the MD5 Hash is generated

2. Attach the drive to a PC and run a hash-checking utility on the entire drive. Some examples of hash-checking utilities include Winhex, HashCalc, Encase and FTK.

   NOTE: The OmniClone® Xi begins hash calculations from sector 0 so when using a software hash checking utility you will typically need to subtract 1 from the sector value listed in the CHECKSUM.TXT to establish the sector range. Make sure to write-protect your Master Drive before using this method.

3. Use a hardware-based Forensic cloning device like the Logicube MD5™,Talon™ or the IT cloning device the Logicube SuperSonix™

Preparing the Checksum.txt File

The checksum.txt file tells the MD5 Verification Station two important values. The first value is the MD5 Value that was obtained from the Gold Master drive. The second value is the number of sectors that are to be checked. The checksum.txt file looks similar to the sample below:

7A8C05C8223BED18C85527DE471C5CB1,1000000

In the sample above, the MD5 value is 7A8C05C8223BED18C85527DE471C5CB1, and the second value tells the unit to scan the first 1000000 sectors of the drive.

The Checksum.txt file can be opened and edited in *Notepad.exe* or another text editing utility. It can be accessed by inserting the CF drive in a card reader or through the USB port of the OmniClone® Xi.

How to use the Verification Station

Setup

1. Attach the Master and Target drives to the Verification Station modules the same way that they would attach to a standard Drive Station.
2. If necessary, consult the OmniClone® Xi User Manual for more detailed instructions on connecting drives.

Cloning and Verifying in One Session

1. Verify that checksum.txt on the CF Drive contains the correct MD5 value and number of sectors to scan.
2. Press the SET button on the OmniClone® Xi unit. Press the current cloning mode icon, a mode menu will appear. Change the Mode from Mirror Clone mode to Clone and Verify Mode.
3. Change the Speed setting if desired, then press the START/STOP button.
4. Each Standard Drive Station and Verification station will power up and begin to clone its attached drive.
5. After cloning is complete, the MD5 verification process will begin. Standard Drive Stations will be ignored during this process.
6. When the last drive is finished scanning, the Omniclone-Xi will display a “PASS” or “FAIL” message. The location of any drive(s) that fail the MD5 verification process the will be displayed on the touch screen.

   Example: The following drives failed MD5: Target 3

Cloning Separately

1. Press the SET button on the OmniClone® Xi unit. Press the current cloning mode icon, a mode menu will appear. Change the cloning mode to 100% Mirror clone mode.
   NOTE: The Verification Station will not be able to compare the MD5 Hash value of any drives that are cloned with Clever Clone Mode. This setting adjusts partition information and changes the MD5 value.

2. Change any cloning settings as desired. When ready, press the START/STOP button twice.
3. If necessary, consult the instructions in your OmniClone® Xi manual for more detailed cloning procedures.

Verification Scanning Separately

1. Verify that checksum.txt contains the correct MD5 value and number of sectors to scan.
2. Press the SET button on the OmniClone® Xi unit. Press the current cloning mode icon, a mode menu will appear. Change the Mode from Mirror Clone mode to MD5 Checksum Mode.
3. Change the Speed setting if desired, then press the START/STOP button.
4. Each Verification Station will power up and begin to scan its attached drive. Standard Drive Stations will be ignored during this process.
5. When the last drive is finished scanning, the Omniclone-Xi will display a “PASS” or “FAIL” message. The location of any drive(s) that fail the MD5 verification process the will be displayed on the touch screen.

   Example: The following drives failed MD5:
   Target 3

11. Combo Station

Introduction

The Logicube Combo Station is designed to attach directly to your OmniClone® Xi HDD Duplication device. It features multiple connectors that allow a variety of different media to be cloned without the need for special adapters. The following media are directly supported by the Combo Drive.

- 2.5” notebook (laptop) drives
- 1.8” drives
- PCMCIA (CardBUS) drives
- Compact Flash (CF) drives

How to Install

1. Turn off the power to the OmniClone® Xi and unplug the power supply cord.
2. Remove the drive and any cables from the Standard Drive Station.
3. Loosen the two thumb-screws located on either side of the Drive Station.
4. Pull straight up on the thumb-screws, the Drive Station should come right out.
5. Insert the Combo Station into the now-empty slot. Make sure that the IDE-style connector on the bottom of the Combo Station lines up with the socket inside the OmniClone® Xi unit.
6. Tighten the two thumb-screws on either side of the Combo Station.
7. Repeat Steps 1 – 6 for any other Combo Stations that need to be installed.

NOTE: The Combo Station can only be used in both the Master and Target positions on the OmniClone® Xi.

How to use the Combo Station

The top of the Combo Station has three slots available for CF drives. 1.8" drives and PCMCIA drives*. Each type of media has its own unique slot that it can plug into. White arrows denote the direction that the label should face. 2.5" drives are attached to a small cable that plugs into a socket on the side of the Combo Adapter. The label of the 2.5" drive faces up.

*The SD Flash Media slot is non-operational as of this writing.

How to connect drives to the Combo Station

CF, 1.8" and PCMCIA drives

1. Find the correct slot that is clearly marked on the top of the Combo Station. Each type of drive has its own unique slot.
2. Face the label of the drive in the direction indicated by the small white arrow located next to the drive slot.
3. Gently insert the drive into the slot until it slides into place. DO NOT FORCE the drive as bent or broken pins can result.
4. Follow the instructions in your OmniClone® Xi manual to clone your drive.

2.5" drives

1. Find the 44-pin socket that is on the side of the Combo Station.
2. Attach the small ribbon cable to the socket. Be sure to align the tab on the cable head with the notch in the socket.
3. Gently attach the 2.5" drive to the other end of the cable. Make sure that the drive label faces up. DO NOT FORCE the drive or cable as bent or broken pins can result.

Notes

- Do not force the drive into any of the slots. This can result in bent or broken pins.
- Do not drop any foreign objects into the Combo Station; this can result in damage to the Combo Station, drive or the OmniClone® Xi itself.
- Never attach more than one drive at a time to the Combo Station. This can result in damage to the drives.
- Optimal speed results can be achieved by manually lowering the speed setting for different types of drives. Lower the speed setting to UDMA-4 for 1.8” drives, UDMA-2 for PCMCIA drives and PIO-AUTO for CF drives. 2.5” drives run best at UDMA-5.

12. Software Loading Instructions

Logicube OmniClone® Xi Software Updating Procedures

New and improved software will appear from time to time on our web site at *www.logicube.com*. It is possible to update the operating software in the field by a user.

Two common ways are available:

- Using the Compact Flash card
- Using a parallel port connection

NOTE: Logicube provides a floppy disk that contains a backup copy of the Logicube OmniClone® Xi software. This software is already loaded on your unit.

Loading Software Using the Compact Flash

The new software (a single file always called ocx.h86) has to be placed on the root directory of the Compact Flash (CF). If a CF reader/writer is available on your computer, ocx.h86 simply needs to be copied to the root directory, possibly overwriting the older version that's already there.

Another file called ocxcfldr.h86 also needs to be on the root directory of the Compact Flash Card.

NOTE: If a reader is not present, the Logicube OmniClone® Xi itself, in conjunction with the USB dongle can be configured to behave like a CF reader/writer. Please refer to "**Connecting Through the Software Setup Menu**" in **Section 8: Compact Flash (CF) Drive**.

Once the new ocx.h86 file is present on the CF, it is a simple matter to make it "re-flash" the unit:

1. Remove the Master Drive from the unit if it is connected.

2. Boot The Logicube OmniClone® Xi while holding down the **Start/Stop** button. The unit will boot to the Software Setup Menu.
3. Use the **Select** button to Scroll down to "Engage CF to USB". Press the **Start/Stop** button.
4. . The status lights should light up for 15 – 20 seconds, then start to blink.
5. After about 30-40 seconds the unit will re-boot to the new software.
6. Check the version and date of this software by pressing the "**About**" icon at the main menu screen.

Loading Software Through the Parallel Port

This is a legacy method to load software, and should only be used in situations where the CF method cannot be used.

To successfully load new software on to the Logicube OmniClone® Xi with the parallel port connection, you need the following:

- The Software Update CD that came with your unit.
- A DB-25 Straight-through parallel cable.
- (If loading new software), a floppy or other removable drive with the new version of ocx.h86 loaded on it.
- A host PC with the following:
  - An EPP 1.9 capable parallel port.
  - A CD-ROM drive.
  - A floppy drive or other removable drive accessible by DOS.
  - Ability to boot from a CD. This can be determined by checking the PC's BIOS.

Host PC preparation

1. Place the Software Update CD in the Host PC's CD-ROM drive.
2. Boot the PC and go into BIOS. Make sure that the PC is set to boot from the CD-ROM.
3. Reboot the PC. It will go into a menu on the CD that contains six different boot methods.

4. Try the first boot method. If it doesn't work, reboot and try the second. Keep trying until you find one that works (goes to an A prompt).

Once the above has been accomplished, perform the following:

1. Attach the parallel cable between the host PC and Logicube OmniClone® Xi.
2. If you are loading a new version of software, Insert the removable drive with the new ocx.h86 file and copy it to the Ramdrive created by the CD.
3. **NOTE:** Ignore step 2 if you are reloading the original ocx.h86 file, which is automatically copied to the Ramdrive.
4. Go to the Ramdrive (always the last drive letter) and run **UPDATE**. The Software Update screen will appear.

Logicube OmniClone® Xi Software Update

Note: Make sure the update is running on the PC and the Logicube OmniClone® Xi is connected to the host PC via the supplied parallel cable.

1. Press and hold the **START**/**STOP** button on the Logicube OmniClone® Xi while inserting the power cord into the Logicube OmniClone® Xi to bring up the Setup menu.
2. Scroll to the "Load SW from P. Port" option in the menu.
3. Press **SELECT** to UPDATE software and then follow the LCD on-screen prompts. The update will run for one to three minutes after which the Logicube OmniClone® Xi will restart.
4. Check the version and date of this software by pressing the "**About**" icon at the main menu screen.

13. Frequently Asked Questions and Answers

FAQ's

Q. By comparison my Logicube OmniClone® Xi appears to be operating slower than other units.

A. Make sure that your unit is using the latest software. Visit *http://www.logicube.com/* and go to the support page to view the latest software level and if necessary download the software for your system.

Q. Drive information as displayed on the Logicube OmniClone® Xi Drive Info screen does not agree with the label fixed to the target HDD. Example: The number of cylinders displayed is different than the label

A. Drive labels will only show Cylinders, Heads, and Sectors for a maximum of 8.5GB (example: 16383, 16, 63.) The actual drive parameters will be displayed both in drive information, and in the printed session report. Most of the newer drives only have an LBA (Logical Block Addressing) value printed on the label showing the drive's capacity in sectors

Q. Cloning data to or from a Western Digital HDD is not working properly.

A. Most Western Digital drives require that the jumpers be removed for a capture to work. The exception to this statement is for the Western Digital "Xpert" series Hard Drives (an older manufactured version), where the jumper is set to the master position.

Q. I'm trying to update my Logicube OmniClone® Xi with the latest software but I cannot get my PC to communicate with the unit.

A. The PC must be set up to communicate in the Bi-directional mode through the BIOS setup. Refer to your PC user manual. Also, you could try to update the unit using the Compact Flash card. Instructions on how to do that are available elsewhere in this manual.

Q: Do Target drives have to be formatted and partitioned prior to cloning?

A: No. Target drives do not need to be formatted, partitioned or otherwise modified prior to cloning. The Logicube OmniClone® Xi disregards everything on the Target drive, reformatting and partitioning it during cloning.

Q: Are NT 4GB FAT16 partitions (also known as "NT FAT") supported by the Logicube OmniClone® Xi?

A: Yes, through Mirror Clone™ mode only.

Q: Can the Logicube OmniClone® Xi clone partitions created with file systems such as UNIX, LINUX and HPFS?

A: Yes, but results are guaranteed only if they are cloned between identical Master and Target drives. However, partitions of some versions of UNIX will self-repair upon the first boot.

Q: Can the Logicube OmniClone® Xi defragment a partition?

A: Yes. Refer to Section 3: Cloning Modes and Settings for information on using Selective Partitions to defragment a FAT partition while cloning.

Q: Can the Logicube OmniClone® Xi clone between dissimilar drives?

A: Yes. For Master drives that contain FAT16, FAT32 and NTFS partitions, the Logicube OmniClone® Xi will take care of all the necessary adjustments to ensure that a Target drive of any size will be valid and bootable. Many combinations of Master and Target drives sizes up to 750 GB were tested and found to be valid.

Unknown partition types, however, are cloned in mirror mode and typically require very similar if not identical Master and Target drives to guarantee a successful clone.

Q: Can I clone to/from drives larger than 8.5 Gigabytes?

A: Yes. The OmniClone® Xi was designed to support drives larger than 137 GB in capacity. However, note that some PC's cannot "see" drives larger than 8.5 GB due to BIOS limitations.

Q: Can I clone from a larger drive to a smaller drive?

A: Yes, as long as the data content of each Master partition is able to fit into the scaled down size of the corresponding Target partition. Otherwise, an error message will be displayed indicating that the Solitaire Turbo™ is unable to fit the data onto the Target drive.

The error "Cannot fit data to Target" can also be caused by a badly fragmented Master drive. In such cases, defragmenting the Master will generally resolve the issue.

Note that an NTFS partition can only be scaled down by approximately 55% due to the master file table (MFT) that resides in the center of the partition.

Q: Can I clone to/from laptop drives?

A: Yes. Logicube sells 2.5" drive adapters, and can provide adapters to many of the special drive connections on the market. Please call for availability.

Q: How does the Logicube OmniClone® Xi handle Windows NT Security Identification (SID) duplication issues?

A: The Logicube OmniClone® Xi does duplicate the SID. Because of this, it is recommended that a SID changer be installed on the Master drive so that the first time the newly cloned Target is booted-up, all SID's will be replaced with fresh ones.

There are a number of SID changer utilities available. A freeware SID changer is available at *www.sysinternals.com* for download. Note that Logicube assumes no responsibility for this or any third party software, and can only provide limited support in its use.

Q: How does the Logicube OmniClone® Xi handle bad sectors encountered on the Master and Target drives during cloning?

A: On the Master drive, if OmniDiagnostic™ has been installed and its Recover feature has been enabled, the Logicube OmniClone® Xi will attempt to recover the data from any bad sectors encountered.

If OmniDiagnostic™ has not been installed or its Recover feature has not been enabled, the Logicube OmniClone® Xi will immediately skip over any bad sectors on the Master drive. Note that several attempts will be made to correctly read the sector before skipping.

On the Target drive, with the Verify setting enabled, the Logicube OmniClone® Xi will also skip over any bad sectors. If the Verify setting is disabled, the Logicube OmniClone® Xi will not detect bad sectors on the Target and the cloning procedure will continue regardless.

Note that newer drives perform automatic bad sector reallocation on their own and will, therefore, rarely show a bad sector.

Q: Can I clone drives with virus protection software installed?

A: Yes, but remember to decline the "repair" of the target drive should a virus protection program complain about an altered master boot record, etc.

Q: How does the Logicube OmniClone® Xi determine the size of partitions to create on the Target drive?

A: In the default Cleve Clone mode, all known partition types (i.e. FAT16, FAT32 and NTFS) are scaled proportionally to the ratio of Master/Target size. Note, however, that FAT16 partitions will not exceed 2.1 GB when scaled up, nor be smaller than 32 MB when scaled down.

All unknown partitions (e.g. HPFS, UNIX, etc.) are mirrored, that is they maintain their size.

Q: What is the difference between 100% (Mirror) Clone™ and Clever Clone™?

A: 100% Clone™ simply copies the user-designated percentage of all sectors on a hard drive starting from sector one. It does not look at drive structures and thus can copy any type of known or unknown partition.

Clever Clone™ analyzes the drive structures prior to cloning and only copies sectors that are occupied by useful files and data. It also adjusts the various drive structures to assure a valid and fully partitioned target drive. For these reasons, Clever Clone™ is the default cloning mode, and recommended for use wherever possible.

Q: Can the Logicube OmniClone® Xi correctly clone hard drives with dual boot configurations, even in conjunction with NTFS?

A: Yes. The Logicube OmniClone® Xi will clone a FAT16 followed by either an NTFS or another FAT16 partition correctly and adjust all the necessary structures so that dual booting is possible. It will also correctly handle dual boot configurations that use the same partition.

Troubleshooting Guide

Q: Why do I sometimes see transfer speeds that exceed 3.5 GB/min and then other times as slow as 200 MB/min?

A: There are many factors that determine transfer speed. For example, the speed of the cloning operation is governed by the slowest drive being used. If an older drive is used as either Master or Target, chances are it cannot sustain a high data transfer rate. Newer drives have faster electronics and lager on-drive caches that allow them to reach transfer rates of 33 MB/sec or more.

The type of cloning operation performed can also affect transfer speeds. When cloning FAT16 partitions, it is sometimes necessary to change the cluster class of the partition. In such cases, the Logicube OmniClone® Xi utilizes a more complex method of ensuring it creates a valid Target drive.

With OmniDiagnostic™ installed and its Recover feature enabled, the Logicube OmniClone® Xi will attempt to recover data from bad or weak sectors found on the Master drive. This is a time consuming operation that could cause the overall cloning speed to drop significantly.

Q: The Logicube OmniClone® Xi does not recognize my Master/Target drive.

A: Make sure that the drive jumpers are set to Master/Single. Drive jumper settings can be found at the drive manufacturer's web site. Also, check the condition of the power and data cables; they are rated for a maximum of 500 insertions. New cable sets can be ordered from Logicube.

Q: My Target drive will not boot. Why?

A: Please check several things:

First, make sure that the correct CHS Mode was selected for the Target drive. This will depend upon the capacity of the Target drive and on the BIOS of the PC in which it will be used. Check with the hard drive and PC manufacturers to determine which CHS mode is best as different BIOS systems use different translation methods for large (> 528 MB) capacity drives. See Section 3: Cloning Modes and Settings for more information on the CHS Mode preference setting.

Also check and make sure that the first partition selected for cloning on the Master drive consists of a bootable operating system. It is possible to select a data-only partition to be cloned. However, if it becomes the first partition on the Target, a PC will not consider that drive to be a valid boot drive.

Finally, scan and check the Master drive for possible problems using a hard drive utility such as Window's Scandisk or Chkdsk. Some problems may not show up with casual booting of the Master, but things such as cross-linked clusters can cause serious cloning errors.

Q: All but the first partition is missing from the Target drive. How did that happen?

A: This is usually the result of having the wrong CHS translation mode for the Target drive being used. See Section 3: Cloning Modes and Settings for information on selecting a CHS mode.

Q: Why do I have un-partitioned free space at the end of my Target drive?

A: This typically occurs when the Master drive has FAT16 partitions only and the Target is much larger than the Master. FAT16 partitions cannot scale up to more than 2.1GB each. FAT32 and NTFS partitions do not suffer from this limitation and will always be scaled up to fill the target drive.

This can also happen if Mirror Clone™ is used to clone from a small drive to a larger Target drive.

Q: I receive the error: "Drive error– either the speed setting is too high, or a bad sector was encountered". What is causing this?

A: This error is typically the result of using slower (older) drives, or using drives that have weak or bad sectors. Defragmenting the master drive or adjusting the Speed setting to a slower mode can sometimes resolve this error.

Q: Why do I receive a "Not Enough Memory" error when running Scandisk or Defragment on cloned Windows 9.x systems?

A: This issue only applies to FAT32 partitions. The error occurs because both Scandisk and Defragment cannot handle the increased number of clusters that exist when Targets larger than 8 GB have been cloned from Master drives smaller than 8 GB.

To prevent the problem from occurring, change the Logicube OmniClone® Xi default Clever Clone™ mode to Selective Partitions™. Then select the Defragment copy method for the partition(s) you wish to clone. This will resize the clusters and reduce their number.

Q: Why does my cloned Windows 2000 or Windows XP partition boot to a blue screen?

A: The CHS mode for cloning needs to be set to LBA-1 or LARGE-1. If one of these was used, then set the CHS mode to LBA-2 or LARGE-2. You may also need to set the Speed option to a lower setting.

Q: Why do I get the error “Can’t fit data to Target” when cloning between drives of the same size?

A: The drives may be from different manufacturers and the Target actually somewhat smaller than the Master. Also, the Master drive may have some data at the very end of the partition. This would prevent it from scaling down.

We recommend that you use a defragment utility on the Master drive before cloning it to the Target again.

Q: My cloning session stops with the error “Error initializing/writing NTFS data.” Why?

A: This error means that NTFS Clever Clone™ has encountered corrupt data in the boot sector, MFT or Volume Bitmap of the Master drive. The drive may still boot in a PC, however.

Q: My cloning session always stops at a certain point with a "Drive not ready" error message. Why?

A: The Master drive may have too many bad sectors for the unit to skip over. In rare cases, sectors can also be too damaged for the unit to skip over. Please refer to the Scan Target Mode and Repair Target Mode information located in Section 4: Omnidiagnostics™.

Note that if Verify is set to 1% or 100%, the bad sector(s) may be on the Target drive.

Q: Why does the cloning session stop with an "Invalid MBR" error message?

A: This error comes up when the partition table or boot sector contains corrupt data. Despite the error, the Master drive may still boot in a PC.

For further assistance please contact Logicube's tech support at: 818 700 8488 ext. 3, or by email to techsupport@logicube.com. Logicube tech support is available 8am – 6pm PST, Monday through Friday, excluding U.S. legal holidays.

14. Reference

Glossary

BIOS (**B**asic **I**nput/**O**utput **S**ystem)

Built-in software on a motherboard that contains the instructions required for a PC to boot, control the hard drives, keyboard, monitor and serial communications, and perform other low level functions.

CHS (**C**ylinder, **H**ead, **S**ector)

The normal or default translation mode used by a PC for hard drives that are 504 MB or smaller in capacity. CHS is the only translation mode available in older BIOS (generally any made prior to 1994). It will only show a maximum drive size of 504 MB no matter how large it's true capacity.

Cloning, Hard Drive

The process of copying the contents of one hard drive to another with the intent of making an exact duplicate.

Cluster

The smallest logical measurement of file storage space on a hard drive. Every file stored on a drive takes up one or more clusters of storage. The clusters associated with a file are kept track of in the drive's File Allocation Table (FAT). The maximum number of available clusters on a drive depends on the available size of the FAT table.

CRC (**C**yclic **R**edundancy **C**hecking)

A method of checking for errors in data transmitted from one device to another, e.g. from one hard

drive to another. With CRC the sending device applies a 16- or 32-bit polynomial to a block of data to be transmitted and then appends the result to the block. The receiving device applies the same polynomial to the data block and compares that result with the original. If the two values agree, then the data has been transmitted without error. If the values don't match, then the sender is notified to resend the block of data.

CRC ensures detection of 99.998% of all possible errors.

Defragment

The process of taking noncontiguous fragments of a data file stored on a hard drive and rearranging them into one contiguous group, resulting in reduced data access times and more efficient use of hard drive space.

Fragmentation occurs naturally over time as files are created, deleted, and modified. Some operating systems come with a utility for defragmenting drives. Third party defragment utilities are also available.

DMA (**D**irect **M**emory **A**ccess)

A method of transferring data from one computer device to another directly through main memory without passing it through the CPU.

EIDE (**E**nhanced **I**ntegrated **D**rive **E**lectronics)

A high-speed electronic interface used for transferring data between a computer and the computer's hard drive. The theoretical maximum IDE transfer rate is 16.6 MB/sec depending on the hard drive speed, the transfer mode and the operating system.

FAT (**F**ile **A**llocation **T**able)

A table that an operating system uses to locate data stored on a hard drive. The FAT system for DOS 4.0 and above, and for older versions of Windows 95 is called FAT16. The FAT table for Windows 95 OSR2 or newer, Windows 98 and Windows ME is called FAT32. FAT16 allows for a maximum of 65,536 clusters while FAT32 allows for enough clusters to support up to two terabytes of data.

Geometry, Hard Drive

Hard drive geometry is the set of physical characteristics that belongs to a particular drive, specifically:

- The number of platters and cylinders
- The number of tracks per cylinder
- The number of sectors per track, and
- The size of each sector (in bytes)

IDE (**I**ntegrated **D**rive **E**lectronics)

An electronic interface used for transferring data between a computer and the computer's hard drive. Most new computers use an advanced version of IDE called Enhanced Integrated Drive Electronics (EIDE).

Large

Also called Extended CHS (ECHS) in some BIOS versions, Large is a BIOS translation mode that extends the 504 MB drive size barrier of the standard CHS mode to 4.2 GB.

LBA (**L**ogical **B**lock **A**ddressing)

A translation mode that converts the cylinder, head, and sector specifications of a hard drive into logical addresses that can be processed by the BIOS. LBA supports drives up to 32 GB or larger depending upon the limitations of the BIOS. To use, it must be supported by both the BIOS and the drive.

Master Drive, Logicube OmniClone® Xi

The hard drive from which the Logicube OmniClone® Xi is copying data to the Target drive. The Master drive is commonly the one placed inside the Logicube OmniClone® Xi.

Not to be confused with IDE Master/Single Drive.

Master/Single Drive, IDE

The primary or controlling device connected to an IDE interface. The second device connected to an IDE interface is called the Slave drive. Whether a device is the Master or the Slave is determined by jumper settings on the device, itself.

Not to be confused with Logicube OmniClone® Xi Master Drive.

NTFS (**N**ew **T**echnology **F**ile **S**ystem)

The standard file system of the Windows NT operating system. It offers a number of performance, extendibility, and security improvements over the File Allocation Table (FAT). Partitions created using NTFS are not accessible from other operating systems such as DOS.

Parallel Port

An interface for connecting to a computer or an external device such as a printer. Often called a Centronics interface after the company that engineered the original specification.

A newer standard is the Enhanced Parallel Port (EPP), which supports bi-directional communication and transfer rates up to ten times faster than a standard parallel port.

Partition

A way of dividing physical hard drive space into logically separate segments, which an operating system treats as individual hard drives. Partitioning is particularly useful when multiple operating systems are loaded on one drive. For example, creating one partition for Windows NT, another for UNIX and so on.

PIO (**P**rogrammed **I**nput/**O**utput)

A method of transferring data between two devices in which all data passes through the CPU. A newer alternative to PIO is Direct Memory Access (DMA). See also UDMA.

QWERTY

Refers to the arrangement of the keys on a standard English computer keyboard. The name derives from the first six characters located on the top row of the keyboard.

RAM Disk

RAM that has been configured to appear to a computer as a hard drive. Files on a RAM disk can be accessed just as files on a physical drive. However, RAM disks lose their contents once the computer has been turned off or rebooted. Also known as a RAMDISK or RAMDRIVE.

Sector

The smallest physically divisible area of a hard drive where data can be written to, or read from. The first sector, (known as the master boot record, the partition sector, or the partition table) tells the computer vital information about the drive such as how many partitions it has.

SID (**S**ecurity **ID**)

A security feature in the Windows NT and Windows 2000 operating systems comprising of a unique alphanumeric character string used to identify a user or a group of users on a network. When a user attempts to access a resource on the network, the user's SID is checked to determine if they have the correct permissions to perform the requested action.

Slave Drive, IDE

The secondary device connected to an IDE interface. See Master/ Single Drive.

SMART (**S**elf-**M**onitoring, **A**nalysis, and **R**eporting **T**echnology)

A diagnostic utility built into some modern hard drives that constantly monitors the media, electronic components and mechanical components. If something is encountered that indicates a problem, SMART is capable of notifying the user.

Target Drive, Logicube OmniClone® Xi

The hard drive to which the Logicube OmniClone® Xi copies the contents of the Master drive. The Target drive is commonly the one connected externally to the Logicube OmniClone® Xi.

Translation Mode, CHS

A way of logically representing the physical geometry of a hard drive such that the BIOS of a computer can interface with it. The type of translation mode supported by the BIOS will determine the maximum size a drive can be. The most common translation modes are CHS, Large and LBA.

UDMA (**U**ltra **D**irect **M**emory **A**ccess)

A high-speed method of transferring data between a hard drive and a computer's memory. Ultra DMA/33 protocol transfers data at a rate of up to 33.3 MBps, twice the rate of standard DMA.

USB (**U**niversal **S**erial **B**us)

A high-speed serial interface for connecting external peripherals to a computer. USB 1.x supports data transfer rates of up to 12 Mbps (Megabits per second). USB 2.0 supports data rates of up to 480 Mbps. USB 2.0 is fully backward compatible with USB 1.x, both using the same cables and connectors.

Wiping, Data

The process of securely erasing information from a hard drive using a utility that writes a defined or random pattern of data one or more times onto every sector.

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